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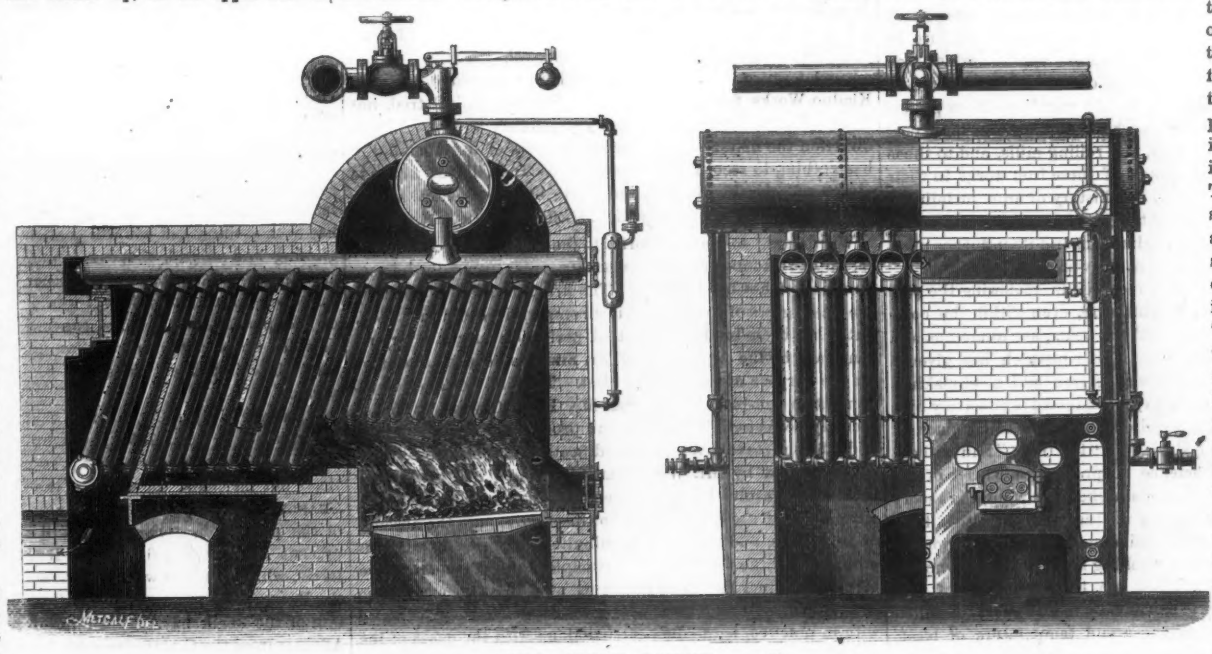
The Allen Boiler.

WE have already illustrated and described the Allen engine. We now give the boiler designed by the same engineers to supply with safety and economy their engine. The use of high-pressure steam in a shell boiler is necessarily attended with more or less danger, and hence, of late years, various designs have been made to insure security in its use by dispensing entirely with the shell. The water in a shell boiler surrounds the flues or tubes, through which the flame and hot products of combustion are passed; but in the recently-improved constructions to which we refer, and of which the Allen boiler is a very fair sample, the water is contained in the tubes and the flame passes among and around them. This boiler obtained the first premium at the last Fair of the American Institute over five competitors; and so good was the opinion entertained of it by the managers that we understand that they have engaged the boiler which was on exhibition at the last Fair to furnish steam for running the machinery at the next. The newly-applied principle which has been introduced is that of obtaining the circulation of the water in the boiler by giving a slight inclination to the tubes. The angle of 20° from the vertical has been found practically to give the best results, and at this angle it is claimed that the steam instantly rises from the point of generation, whenever that may be, and unites with that already generated and rushes up, on the upper side of the tube, when it maintains a separate channel for itself, and so passes quite dry into the steam drum seen on the top of the boiler.

This principle is practically used by every chemist in boiling solutions in test-tubes. When held at the proper angle liquids can be boiled violently without a single drop being thrown out by the energetic action of the steam. If held vertically over the flame the boiling is irregular and the danger of the operator's receiving the whole contents of the tube in his face is not inconsiderable.

The idea of placing the water in the tubes and allowing the heat of the flame to act from the outside is excellent, on account of the safety which accompanies it. A tube of wrought iron three or four inches in diameter possesses great strength, or rather offers great resistance to a force tending to burst it. A large shell must be made of many times the thickness to sustain the same pressure, and even then an unobserved flaw may render such a boiler very dangerous.



THE ALLEN BOILER.

In small tubes, such as those used in the Allen boiler, of course, accidents may happen; but, in the event of the explosion of one of the tubes, no greater injury would result than the extinguishing of the fire and the entire suspension of proceedings. It is claimed that the rapid circulation of the water prevents the adhering of sediment to any part of the boiler, and that which is held in suspension in the water can, of course, be blown out at any time. The advantages of these boilers may be briefly summed up as perfect safety, rapid generation of steam, low price, ease of transportation, easy access to all parts inside and out, and adaptation to burning any kind of fuel. The boiler as well as the engine of the same name, is manufactured at the Allen Engine Works, 4th av. and 130th st.

Pacific Peaks.

PROF. DAVIDSON, of the United States Coast Survey, stated to the Academy of Sciences, that Mount Rainier, a peak of the Cascade Range, in Washington Territory, is definitely ascertained to have an elevation of 14,444 feet. This is four feet higher than the elevation ascribed to Mount Shasta by our State Geological Survey. Rainier is described as a flat-topped mountain, and this makes it seem lower than if it had a sharp conical peak. It has really three rounded summits, lying in a line, so that when seen from a certain direction they appear to be one. The elevation of this peak was formerly given at only 12,330 feet, and it was placed in latitude 46 degrees and 40 minutes. It is now shown to be in latitude 46 degrees, 51 minutes, and 09 seconds. Mount Baker, a neighboring peak, formerly credited with an elevation of 11,900 feet, is shown by the Coast Survey to be only 10,760 feet high, and within a minute or so of the same longitude as Rainier, though over 100 miles north of it.

It might seem from the foregoing statement that California must yield to Washington Territory the honor of having the highest peak. Oregon claimed precedence for a time for Mount Hood, whose elevation used to be given all the way from 15,000 to 17,000 feet. Late measurements, heretofore given in our columns, degrade Hood to less than 13,000 feet. The only question now is, whether we have a taller peak than Rainier. There is reason to believe that in the Alpine region of California, occupying the high Sierra from Castle Peak to Kern river, a distance of 200 miles, in the southern portion of the State, there is one peak considerably higher. This is Mount Whitney. According to the first volume of Prof. WHITNEY's report, CLARENCE KING, of the Geological Survey, climbed this mountain to an elevation of 14,730 feet, and thought there was a further elevation of 300 or 400 feet. Accordingly Mount Whitney has been generally reckoned to be about 15,000 feet high. Another peak in the same Alpine region is given an elevation of 14,500 feet. If these measurements are approximately correct, we have two peaks in California than Shasta and Rainier. The general elevation of the Kern river region is 8000 feet. None of the main peaks, which are numerous, are less than 13,000 feet high, and for 200 miles there is no pass across the summit under 11,000 feet.

All the great peaks of the Sierra Nevada and the Cascade Range, which latter is a continuation of the former range, were formerly volcanoes, and some of them, including Shasta, Hood, Rainier and Baker, yet exhibit solfatara action, while Hood and Rainier, if not Baker, occasionally emit visible columns of smoke. The crater of Shasta and Rainier have been measured. All these great peaks likewise bear glacial markings, which are common along the Sierra and Cascade Ranges, while Shasta, Hood and Ranier retain large ice fields to this day, those on Rainier in particular being very extensive, one, according to the report of a party who ascended the mountain last summer, being eleven miles long and several hundred feet deep.

The observations made of the leading peaks in California, Oregon and Washington Territory, within a few years, by the Geological Survey of this State and the Coast Survey of the United States, are of great practical as well as scientific importance. They are correcting our geographical knowledge, and affording reliable data for land and coast surveys, for meteorological and physical studies generally, and for future sceneographic descriptions. When their results shall be compiled and compared, they will prove very interesting reading.

BISMUTH, it is announced, has been discovered in Archer county, Texas, by means of the investigations instituted by the General Land Office into the mineral resources of the several States. The Bismuth ore is associated with copper glance, but in separate veins. The metal is disseminated in small grains through quartz, and a heat of 500° Fahrenheit is necessary to fuse the Bismuth, which is collected as it runs from the furnace

The Cornish Engine.

THE cylinder is enclosed in a steam jacket, or casing of cast iron, having a clear space of about an inch all around. The annular space thus formed around the cylinder is kept constantly filled with steam from the boilers through a pipe which is constantly kept open. The boilers are fixed at a level below the bottom of the cylinder, and a drain-pipe is fixed at the bottom of the steam jacket, which conveys back to the boilers the water formed by condensation around the cylinder. This mode of keeping the cylinder hot is very important, and is a great element of economy. Other means have been devised and tried—such as enclosing the cylinder in flues from the furnaces—but have not succeeded. The cylinder in that way gets too hot, the friction is increased, and the packing is damaged. In the earlier jacketed engines the steam for the engine was taken from the steam jacket, but the plan has subsequently been abandoned, and the steam pipe is now always made to lead direct from the boilers to the "top nozzle." The steam jacket keeps up the temperature of the cylinder at the temperature of the entering steam, and prevents thereby an undue condensation during expansion, whilst it tends to evaporate any moisture which may be deposited, and its chief beneficial effect arises from the fact that, although the same quantity of water is condensed in the jacket as would have been condensed in an unjacketed cylinder, steam, whilst it remains as such on the piston, is capable of giving out work, and the condensed steam from the jacket returns to the boiler at the temperature of the water instead of being thrown into the condenser. The liquefaction of steam in the jacket arises from the philosophical phenomenon of the transfer of heat into motion. For every 722 foot-pounds, or units of work, done by the steam, one unit of heat disappears, and a quantity of water proportionate to the loss of heat thus produced is formed by condensation in the jacket—if one exists—if not, then in the cylinder. The jacket also equalizes the temperature of the cylinder, and thereby prevents unequal expansion of the metal.

To prevent a loss of heat by radiation it is usual to clothe the cylinder, but the manner of clothing varies according to the discretion of the engineer. One method is to surround the jacket with a wood casing, leaving a space of from 6 inches to 12 inches, which space is filled with a bad conducting material, such as sawdust or felt. Another plan is to build a brick wall, 9 inches thick, all around, leaving an air space between it and the jacket, and to cover the brickwork with wood. When the clothing is well done, the temperature outside casing seldom exceeds 75 degrees, and the atmosphere of the engine-house is often only a few degrees warmer than the external air. It was the practice formerly to steam-jacket the cover and bottom of the cylinder, but the inconvenience attending the breaking of the steam pipe joint every time the cover was removed led to its abandonment; and although jacketing the bottom can be of no advantage whatever, it is still sometimes done. It will be readily seen that the steam has no contact with the bottom till it has done its work, and we cannot see that imparting heat to it after that can serve any good purpose; on the contrary, we consider it worse than useless. The cylinder cover is clothed with felt or sawdust, and the stuffing-box is provided with a "lantern-brass," as it is technically termed, which consists of a skeleton piece of brass placed in the centre of the packing around the rod, to allow steam to be introduced; a small steam pipe is attached to the stuffing-box, opposite the situation of the lantern brass, leading from the steam jacket. In this way the packing is kept steamed, and the air is prevented from entering through the stuffing-box to the cylinder.

We have above alluded to the fact that great strength is required in the working parts; great strength implies great weight, and we come now to consider the effect of the weight. In the engine itself the beam is of course the heaviest of the moving parts. An 80-inch engine beam weighs about 23 tons;

the piston, rod, and cap together about 5 tons, so that altogether the moving parts of the engine weigh approximately 30 tons. Let the engine be loaded to 10 lb. on the square inch of the piston, the moving load will then be about 60 tons, including the balance bobs. It is the inertia of this great moving load which enables the engine to be worked with a high degree of expansion; it acts as a fly-wheel on the engine to a certain extent, and without it high grades of expansion could not be employed.

We will now consider the action of the engine. During the time in which the piston-rod is going into the cylinder the engine is said to work its "indoor" stroke, and the reverse stroke is called the "outdoor" stroke. Let the engine be supposed to be commencing its indoor stroke, then the piston would be at the top of the cylinder, and the steam valve would be suddenly opened—by means which we shall fully illustrate in future papers—allowing the steam to act with full force on the piston; the result is that the piston descends in the cylinder, but as it does so the steam valve is closed, yet the steam valve being greatly in excess of the load at the point of cut off, the piston still continues its motion, and as it does so the pressure and load coincide at a certain point; still the piston does not stop here, the momentum of the load—which by this time has acquired a high velocity—carries it forward to the end of the stroke. Thus it is seen that there is no loss of energy from reciprocation; each stroke is a distinct operation, the load passes from rest to motion, and *vice versa*, without a loss of energy, or any remaining to be carried to the next stroke. All the energy imparted to the moving load by excess of steam pressure at the beginning of the stroke is spent in maintaining the motion of the piston after the steam pressure has ceased to be sufficient in itself to keep up the motion.

Progress in Iron Smelting—1866-70.

THE history of civilization is made up of many chapters, but few of these chapters appear to the general public to possess that prominence in which they actually deserve to stand when the true connection of causes and events is justly and clearly measured and defined. Few historians have found it worthy of their attention to compare the crude methods of iron metallurgy in one age with the more or less refined and scientific methods of iron and steel manufacture existing at a later and more modern period, and to trace the obvious connection which these important changes in the mode of manufacture, in the price and quality, and in the different applications of iron and steel, must have had with many of those events which are ordinarily recorded in history. To the members of our profession, to all those numerous workers of ironstone and coal mines, of blast furnaces, forges, and rolling mills, and to those who have to employ the products of these iron works in their various branches of industry, the history of iron metallurgy will appear in a more prominent light in proportion to its connection with the progress of civilization, and its influence upon the history of this country and of the world at large.

The facts which have to be recorded in reviewing the past progress of iron and steel manufacture, even within the comparatively short period of the last five years, are numerous and important. The influence of scientific research has given a new character to all the processes of iron and steel-making, which, up to a recent date, were conducted exclusively by a kind of practical routine acquired and maintained amongst those initiated in the mysteries of "the trade," and without any reference to natural science or precise knowledge of the laws of nature. The modern researches regarding the theory of the blast furnaces, although not as yet completed, have already effected, and are still producing, a great and important change in the practice of iron smelting and in the construction of blast furnaces. A few years ago, the experience of iron smelters seemed to indicate a tendency to an almost unlimited increase of sizes of blast furnaces and temperature of blast. With a view to economy of fuel, furnaces exceeding 100 feet in height have been built in the Cleveland district, and hot blast stoves have been set to work, which are capable of sending a blast of 1200 degrees and even more into the furnace. The theoretical researches of Mr. ISAAC LOWTHIAN BELL, the results of which were published only two years ago, have thrown a new light upon this subject, and the blast furnace has in recent times become an object of very numerous and close scientific investigations, which will settle many disputed questions, and the result will probably effect a beneficial change from routine to scientific management in iron smelting works. Mr. BELL has pointed out that there are certain limits to the sizes of furnaces and temperatures of blast, which, when attained, cannot be exceeded with beneficial results as regards economy of fuel. Mr. BELL'S researches are still in progress, and they promise to become the foundation for a new and complete theory of the blast furnace, hitherto the least understood of all metallurgical branches.

Another very valuable contribution to the future science of iron smelting has been furnished by Mr. C. SCHINZ in his work on iron metallurgy. Researches of this kind never fail to produce their valuable practical results. The records of the Patent Office show an entirely new train of thought underlying a great number of recent specifications referring to metallurgical inventions. The reductive influence of carbonic oxide and other gases which form the internal atmosphere of a blast furnace, is applied to the reduction of iron ores in many forms and ways hitherto unknown, or at all events unattempted. Experiments are being conducted to bring these ideas to a practical test and to a successful result, and a new road of progress is being vigorously followed as a consequence of the new theories recently propounded. What the results will be nobody can predict, but the fact of such a change in the ideas of metallurgists deserves to be recorded. The researches above referred to are confined to the question of economy of manufacture, and principally economy of fuel. An equally important question in iron smelting is the quality of the iron produced. The problem of removing impurities from the iron stands before the metallurgical world of the present day in the same crude unapproachable form as it existed many years ago. The demand for purer iron has been increased in recent years by the modern methods of steel manufacture, and the attempts at purification in the blast furnaces have therefore been multiplied in an extraordinary manner, but no practical success is on record in this direction, although many promising schemes have been brought before the public at different times. Metallurgists have abandoned the idea of removing sulphur and phosphorus in the blast furnace as hopeless, and they have turned their attention to the calcining kiln, and to the other preparatory processes to which the ore is exposed, before being charged into the blast furnace. This course appears very plausible from its analogy with the well-known and successful method of purifying coal by washing before it is coked. Coal washing is a process much better understood, and more generally applied on the Continent than in this country. This is partly due to the superior quality of British coal, which does not require so much artificial purification, but in a great measure it must be ascribed to a certain conservative spirit and want of proper foresight on the part of a considerable number of coal masters in this country.

There are engineers and makers of coal-washing machinery on the Continent who have made this branch their specialty, and in which they have gained an extensive experience. A great deal could and ought to be learned in this country from these able and intelligent pioneers. The purification of ironstone from sulphur and phosphorus has also been experimented with on the Continent on an extraordinary scale. In Styria and Bohemia, sulphur is being removed from the ironstone in actual practice by calcination and washing, but this somewhat tedious process is applicable only under peculiar conditions. Phosphorus cannot be removed in this manner, and a number of patents have been taken out for different chemicals or reagents which are expected to produce that desired effect. Calcination with chlorides, which was patented by Mr. THOMAS ROWAN, of Glasgow, appeared at one time to have a fair chance of success, but the experiments with this process seem to have been discontinued. M. JACOBY, the manager of the Kladno Iron Works, in Austria, has patented a method of dephosphorising ironstone in the calcining kiln by blowing heated gases of different chemical compositions through the kiln. An experiment on a large scale is now being carried out at the Kladno Works for giving this invention a practical trial, but the results, if obtained, are not yet publicly known. In this direction the history of the recent progress of iron metallurgy has nothing to record as yet, save trials and failures, negative results of scientific interest and merit, but no practical advantages or successes, no commercial benefits, no material progress.

With regard to the accessories to the blast furnace, the greatest improvements are those made in recent years in the construction of hot-blast stoves. The firing of heating stoves by the waste gases of the furnace is a comparatively old invention, but it has been brought to actual perfection only at a very recent date, by the application of Mr. SIEMENS' regenerative stove for the purpose of heating the blast. The first designer of regenerative hot-blast stoves was Mr. E. A. COWPER, who has recently perfected his designs, and produced a very successful and efficient stove. Another modification of SIEMENS' stove is that patented by Mr. WHITWELL, and which has given very satisfactory results in the Cleveland district. The principal advantages of the regenerative hot-blast stoves are the absence of iron pipes, and the almost unlimited temperature which is attainable by the regenerative principle from the combustion of so poor a fuel as the waste gases of a blast furnace. The only difficulty which these hot-blast stoves have to contend with in practice, is the dust carried along with the gases of the blast furnace, and which settles in the interstices of the firebricks which compose the stove, thereby choking the passages, and requiring frequent attention and labor for cleaning.

The principal aim and merit of these modern constructions of hot-blast stoves, is to provide ample facilities for cleaning the passages and removing the dust without materially disturbing the action of the stove and causing any practical inconvenience in the working of the furnace. The temperature of the blast attainable in these stoves by contact with the firebrick walls is so high that it is not practicable to conduct it in plain cast-iron pipes to the tuyeres, but this has been remedied by a very simple and ingenious contrivance.

The modern hot-blast pipes are lined with firebricks in their interiors, instead of being protected from the outside, to prevent radiation of heat. The external diameter of the hot-blast pipes of modern furnaces is consequently much larger than that of the old-fashioned pipes, to afford room for the internal brick lining, and give the same clear internal area for the passage of the blast. The external cast-iron pipe is protected from direct contact with the hot blast by the internal lining of firebricks, this lining being a sufficiently bad conductor to prevent all possibility of overheating the cast-iron pipe, and at the same time equally effective for preventing great loss of heat by external radiation.

In the construction of blast furnaces, apart from the question of sizes and proportions, few changes have been introduced during the last five years. M. LURMANN, the engineer of the Georgs Marienhutte, near Osnabrück, in Germany, has patented a new form of closed hearth, which has been very successfully applied to some blast furnaces on the Continent; but few applications of his system have, we believe, been made in this country up to the present date. In Scotland it appears that the colossal waste of fuel for which the Scotch smelting works have become notorious throughout the world, continues without much change or progress. Mr. FERRIE, of the Monkland Iron Works, seems to have made some successful attempts in utilizing waste gases. The experiments made a few years ago at the Langloan Iron Works with a compound tuyere for injecting the waste gases back into the furnace along with the blast, and creating a neutral or reductive frame in front of the tuyeres have been discontinued, and no result seems to have been obtained either for or against the idea. Experiments of this kind require a considerable amount of energy, perseverance and capital, and these conditions are not always at the disposal of inventors. This is one of the main causes of the comparative slowness of progress in blast furnace practice, and of the conservative spirit of iron smelters in general. It explains also to a great extent, although it fails to excuse, the barbarism of Scotch blast furnace practice at the present day, and prevents the history of the progress of iron smelting in 1870 from recording one single step in advance when comparing the present blast furnace practice in Scotland with that of ten years ago.—*Engineering*.

The Continuity of the Chalk Formation.

THE following criticism of SIR CHARLES LYELL'S opinion on the Cretaceous period was contributed by Mr. WYVILLE THOMPSON to a recent number of *Nature*.

SIR CHARLES LYELL devotes a paragraph of his valuable "Students' Elements of Geology," just published, to the consideration of what he regards as a "popular error as to the geological continuity of the Cretaceous period." I feel the utmost diffidence in venturing to controvert any opinion of an authority so unrivalled in such questions, but as I believe the first definite suggestion of this view occurs in the report of the *Lightning* Expedition of 1868 by my friend and colleague, Dr. CARPENTER, where it is specially associated with my name, I feel bound to defend so far as I can, or at all events to explain, an opinion which I then held on perhaps somewhat slender grounds, but which further investigation and reflection have since ripened into a firm belief. SIR CHARLES LYELL says (p. 263) that "certain points of resemblance which the deep-sea investigations have placed in a strong light, have been supposed by some naturalists to warrant a conclusion expressed in these words: 'We are still living in the Cretaceous epoch;' a doctrine which has led to much popular delusion as to the bearing of the new facts on geological reasoning and classification." I do not say that the phrase "we are still living in the Cretaceous epoch" is defensible in a strictly scientific sense, chiefly because the terms "geological epoch" and "geological period" are thoroughly indefinite. We speak indifferently of the "Silurian period" and of the "Glacial period," without consideration of their totally unequal value, and of the "Tertiary period," and of the "Miocene period," although the one includes the other. It is intended rather, I believe, in a popular sense, to meet what seems to be the general popular impression, that a geological period has, in the region where it has been studied and defined, something in the shape of a beginning and an end, that it is bounded by periods of change, elevation, denudation, or some other evidences of the lapse of unrecorded time; and that it would be inadmissible to speak of two portions of the same continuous deposit, however distant the times of their deposition might be, and however distinct their imbedded faunæ, as belonging to two geological periods.

It was certainly under this idea that in an address to a popular audience in April, 1869, I stated my belief that it is not only chalk which is being formed at present in the bed of the Atlantic, "but *the* chalk, the chalk of the Cretaceous period." SIR CHARLES LYELL says, in summing up his objections at the end of the paragraph, "the reader will at once perceive that the present Atlantic, Pacific, and Indian Oceans are geographical terms, which must be wholly without meaning when applied to the Eocene, and still more to the Cretaceous period; so that to talk of the chalk having been uninterruptedly forming in the Atlantic from the Cretaceous period to our own, is as inadmissible in a geographical as in a geological sense." I confess I do not understand the geographical difficulty; the "Atlantic Ocean" is doubtless a geographical term, but the depression under discussion occupies the area at present expressed by that term, and to use it seems to be the simplest way of indicating its position. That it is highly probable that the chalk has been so uninterruptedly forming over some parts of that area, is, however, exactly what I wish to show. I will therefore set aside the question of expression, and address myself simply to the consideration of the fact. And first with reference to the physical aspects of the case.

All the principal axes of elevation in the north of Europe and in North America have a date long anterior to the deposition of the Tertiary and even of the newer Secondary beds; and these strata were, consequently, all deposited with a certain relation in position to certain main features of contour, which are maintained to the present day. Many oscillations have, undoubtedly, taken place since, and every spot on the European plateau has probably many times alternated between sea and land, but it is difficult to show that these oscillations have occurred in the latitude of Britain to a greater extent than 1500 feet up and down; a subsidence to that extent would, however, be sufficient to produce over most of the northern land a sea 100 fathoms deep, the average depth of the German Ocean.

From a glance at a geological map of Europe and North America, it would be seen that the sum of these elevations and subsidences has produced a gradual elevation of the edges, and a general contraction, of a basin the long axis of which coincides roughly with the axis of the Atlantic. The Jurassic beds crop out along the outer edge of this basin, the Cretaceous beds from a middle band, while the Tertiaries occupy the troughs and valleys. All of these, however, maintain a certain parallelism, determined by the contour of the older mountain ridges, to one another and to the shores of the present sea.

From the parallel of 55° N. lat., at all events to the equator, we have on either side of the Atlantic a depression of 600 to 700 miles in width, averaging 15,000 feet in depth.

These two valleys are separated by the modern volcanic plateau of the Azores. I cannot think it at all probable that any general oscillations have taken place in the northern hemisphere since the commencement of the Tertiary period sufficient to form that immense abyss, or, if formed, to convert it into dry land; but on this point I am able to quote the highest authority:—"If at any former period the climate of the globe was much warmer or colder than it is now, it would have a tendency to retain that higher or lower temperature for a succession of geological epochs.... The slowness of climatal change here alluded to, would arise from the great depth of the sea as compared to the height of the land, and the consequent lapse of time required to alter the position of continents and great oceanic basins. . . . The mean height of the land is only 1,000 feet, the depth of the sea 15,000 feet. The effect, therefore, of vertical movements equally 1,000 feet in both directions, upward and downward, is to cause a vast transportation of land and sea in those areas which are now continental, and adjoining to which there is much sea not exceeding 1,000 feet in depth.

"But movements of equal amount would have no tendency to produce a sensible alteration in the Atlantic or Pacific Oceans, or to cause the oceanic and continental areas to change places. Depressions of 1,000 feet would submerge large areas of the existing land, but fifteen times as much movement would be required to convert such land into an ocean of average depth, or to cause an ocean three miles deep to replace any one of the existing continents." (LYELL, "Principles of Geology," 1867, pp. 265-6.) The wide extent of Tertiaries in Europe and the North of Africa sufficiently proves that much land has been gained in Tertiary and post-Tertiary times, and the great mountain masses of Southern Europe give evidence of great local disturbance. But although the Alps and the Pyrenees are of sufficient magnitude to make a deep impression upon the senses of men, taking them together, their materials would, if spread out, only cover the surface of the North Atlantic to the depth of about six feet, and it would take at least 2,500 times as much to fill up its bed. It would seem by no means improbable that while the edges of what we may call the great Atlantic depression have been gradually raised, the central portions may have acquired an equivalent slight increase in depth; but it is most unlikely that while the main features of the contour of the northern hemisphere remained the same, an area of so vast extent should have been depressed by more than the height of Mont Blanc. On these physical grounds alone I should be inclined to believe that a considerable portion of this area has been continuously under water, and that consequently a deposit has been forming uninterruptedly from the period of the chalk to our own.

I would now refer to the palæontological bearings of the question. Sir CHARLES LYELL says (p. 263), "The reader should be reminded that in geology we have been in the habit of founding our great chronological divisions, not on foraminifera and sponges, nor even on echinoderms and corals, but on the remains of the most highly organized beings available to us, such as mollusca. In dealing with the mollusca, it is those of the highest or most specialized organization which afford us the best characters in proportion as their vertical range is the most limited. Thus the cephalopoda are the most valuable, as having a more restricted range in time than the gasteropoda, and these again are more characteristic of the particular stratigraphical subdivisions than are the lamellibranchiate bivalves, while these last again are more serviceable in classification than the brachiopoda, a still lower class of shell-fish, which are the most enduring of all." With great deference to Sir CHARLES LYELL, I cannot regard the most highly specialized animal groups as those most fitted to gauge the limits of great chronological divisions, though I admit their infinite value in determining the minor subdivisions.

The culmination of such animal groups, such as we find in the marvellous abundance and variety of both orders of cephalopods at the end of the Jurassic and the commencement of the Cretaceous period, undoubtedly brings into high relief, and admirably illustrates to the student, the broad distinctive characters of the Mesozoic fauna; but speaking very generally, the more highly a mollusc is specialized, the shallower is the water which it inhabits. The cephalopods are chiefly pelagic and surface things, and their remains are consequently found in deposits from all depths. The gasteropods, with comparatively few exceptions, range from the shore to 1 to 200 fathoms, and lamellibranchs become scarce at a slightly greater depth; while some orders of crustacea, brachiopods, echinoderms, sponges and foraminifera, descend in scarcely diminished numbers to a depth of 10,000 feet. In fact, the bathymetrical range of the various groups in modern seas corresponds remarkably with their vertical range in ancient strata.

A change in the distribution of sea and land, involving a mere change in the course of an ocean current, might modify the conditions of an area for all cephalopods, pteropods, heteropods, and other surface living animals of high type, even to their extinction. By oscillations of 500 feet up and down, the great mass of gasteropods and all reef-building corals, would be forced to emigrate, become modified, or destroyed, and another hundred fathoms would exterminate the greater number of bivalves; while elevations and depressions to ten times that amount might only slightly affect the region of brachiopods, echinoderms, and sponges.

In the late deep-sea dredgings by M. DE POURTALES, off the American coast, and by H.M.S. "Lightning" and "Porcupine," and Dr. MARSHALL HALL'S yacht Norma, off the west coast of Europe, no animal forms have been discovered, so far as I am aware, identical with chalk fossils. Additional evidence has, however, been procured that over a large portion of the bottom of the Atlantic a deposit is being formed mainly of disintegrated globigerinæ, and other foraminifera and coccoliths, which appears to be undistinguishable from the ancient chalk.

Not fewer than twenty genera of vitreous sponges have been dredged belonging to two groups—the Hexactinellidæ and the Lithistidæ of OSCAR SCHMIDT—both of which groups are highly characteristic of the chalk and greensand. These sponges are in vast numbers, like the ventriculites and their allies in older cretaceous beds; and they, with other silicious organisms equally abundant in the modern chalk area, seem to be capable of supplying that amount of silica in a fine state of division, which might explain the production of chalk flints. A large series of echinoderms were found, recalling to a remarkable degree, from the profusion of Cidarids and of scar-fishes of such genera as Archaster, Astrogonium and Stellaster, the general facies of the chalk echinoderm faun; and besides this general resemblance, members of several families have been recovered which were supposed to be extinct. *Salenocideras varispina* A. Ag., dredged by DE POURTALES in the Strait of Florida, is a living Salenia; *Echinolampas caratomaides* A. Ag. perpetuates some of the most marked characters of the Galeritidæ. *Pourtalesia*, a genus first found by Count POURTALES, and afterwards in the "Porcupine" expedition, is a true Dysaster. *Porocidaris purpuratus*, a fine species dredged off the Butt of the Lews, represents a genus hitherto known only by some isolated plates and radioles. Two very remarkable generic forms, dredged from the "Porcupine" off the coasts of Scotland and Portugal, only known from some fragments in the English white chalk, found a new family near the Diademidæ. Some new ophiurids approach their fossil ancestors; and off the coast of Portugal the dredge brought up at one rich haul twenty or thirty examples of a fine *Pentacrinus:* while over the whole area *Rhizocrinus loffotensis*, a degenerate little Bourgueticrinus, seemingly one of the last of the pear-encrinites, is abundant.

I am not in a position to say much about those groups, which I have not personally examined, except that Mr. GWYN JEFFREYS and Prof. MARTIN DUNCAN report that among the mollusca and corals many species occur which have been hitherto known only as fossils, principally, as might have been expected, in comparatively shallow water forms in the Tertiaries.

I do not see that there is any object in attempting to explain this singular resemblance between these deep-sea deposits in the Atlantic and the old chalk in composition and structure and in embedded fauna, on any other assumption than that of a continuity of conditions over some part at all events of the area. During the lapse of time, while the fauna or shallower water has again and again undergone almost total change by changes in the distribution of temperature and in the distribution of sea and land, the fauna of the deep water has been also affected. To a depth of 5000 feet it is at present heated over a large portion of the North Atlantic many degrees above its normal temperature. Accepting, as I believe we are now bound to do, some form of the doctrine of the gradual alteration of species through natural causes, one is quite prepared to expect a total absence of the identical forms found in the old chalk. The utmost which might be anticipated is such a resemblance between the two faunæ as might justify the opinion that the latter fauna bears to the earlier the relation of descent with extreme modification. Sir CHARLES LYELL asks if we have dredged belemnites, ammonites, baculites, hamites, turrilites, etc.; that question is, I think, best answered by the record of the old Cretaceous beds themselves, which are scarcely more remarkable for the presence of these singular and beautiful forms than for their rapid extinction. According to the view which I have felt myself compelled to adopt, the various groups of fossils characterizing the Tertiary beds of Europe and North America represent the constantly altering fauna of the shallower portions of an ocean whose depths are still occupied by a deposit which has been accumulating continuously from the period of the pre-Tertiary chalk, and which perpetuates with much modification the pre-Tertiary chalk fauna. I do not see how this view militates in the least against "reasoning and classification" of that geology which we have learned from Sir CHARLES LYELL. Our dredgings only show that these abysses of the ocean which Sir CHARLES LYELL admits in the passage quoted above to have outlasted on account of their depth a succession of geological epochs, are inhabited by a special deep-sea fauna possibly as persistent in its general features as are the abysses themselves.

Electro-Motive Force.

By the Rev. H. HIGHTON, M.A.

THE subject of electro-motive force is so important, and the prevalent idea, that only a definite amount of work can be got out of a definite amount of chemical changes, has so completely blocked the way against a true consideration of the subject, that I think it may be useful if I make a few remarks on the nature of this force.

Let me first contrast it with the force of attraction of gravitation.

There is then, first, this wonderful difference, that the force of gravitation between two bodies varies inversely as the square of the distance between them, whereas electro-motive force is equal at all distances. The electro-motive force developed between a plate of zinc and one of copper, one-tenth of an inch apart, is exactly the same, neither more nor less, than if one is in America and the other in England; and if one were on the earth and the other in the sun, or in the most distant fixed star, there is no reason to suppose it would be any less. This is a fact which will, of course, be acknowledged by every electrician; but I may as well say that I have tried a plate of zinc, placed at ten miles distance from a plate of copper, and found the electro-motive force exactly the same as when they are one tenth of an inch apart. If we coud cut the earth into two hemispheres by an insulating plate, we could transmit any amount of force, or any telegraph message, from any point in one hemisphere to any point of the other without the slightest difficulty. The resistance in that case would be next to *nil;* and as the magnetic and chemical forces transmitted by a circuit are only limited by the resistance of the circuit, almost any amount of power could be transmitted. As we cannot thus cut the earth in two by an insulating plate, we are obliged, in transmitting magnetic or other power from England to America, to use the sphere of the earth for one half of the circuit, and an insulated wire for the other half; and it is the resistance of this wire which limits the amount of force transmitted. Similarly, on the supposition of being able to form a circuit by cutting into two insulated hemispheres the sphere of stellar space, we could transmit any amount of magnetic force to the furthest star.

Nor is this case wholly an imaginary one. As a matter of fact, we have in nature an instance of two enormous conductors with an insulating band between them. There is the earth and sea, which form one conductor; and at a certain distance from them there is a second conductor, consisting of the upper and rarefied strata of the atmosphere, with an insulating band of denser air between them. Now when, from unknown causes, the electric equilibrium between a pole and the zenith is disturbed, a current passes from the zenith to the pole through these rarer strata of the air, and a corresponding current passes through the earth and sea in an opposite direction. This, of course, is the well-known phenomenon of the aurora, with its corresponding earth currents, which are so annoying in the electric telegraph. Whether the circuit is completed through vertical strata of the atmosphere at the equator and the pole, rendered conducting by vapors or other means, or whether there are simply two electric discharges from the zenith to the pole, one in the upper regions of the air, the other in the earth and sea, acting inductively on one another, we cannot be sure. It may be right to add that, in reality, the force of gravity is the same at all distances; but inasmuch as it is a force radiating from the centre, the portion which acts on any given surface varies inversely as the square of the distance, because the whole force extends itself over a space varying as the square of the distance, and, therefore, a given surface receives so much less of it at a greater distance; but the force itself is equal at all distances.

Secondly. There is this important difference between gravity and electro-motive force; that the one acts only in straight lines, whereas the other appears to be wholly indifferent how tortuous its course may be. Provided only there are two channels of communication between two metals, one forming a liquid communication, and the other a metallic or gaseous conductor, the straightness of the two channels makes very little difference.

Now observe the enormous practical importance of this point. Suppose we want to avail ourselves of the force of gravity as a motive power to do work. The work produced is as the mass on which it acts, multiplied by the space (or square of the time) through which it acts. Thus, if we must use it to move clockwork, and want it to make the clock go for a very long time, we must raise a given weight to a proportionate height; and the more power we want to get from it the higher we must raise the weight in the first instance. Then, the force of gravity, acting through a longer space and longer time will produce so much more work; and the work done is in proportion to the perpendicular height to which the weight is raised, measured in a straight line. But if we want to increase the work we can get out of the electro-motive force of a pound of zinc, and for this purpose increase the time and space through which it acts, we may place it as near as we like to a plate of copper (indeed, the nearer the better), and increase the space and time through which the electro-motive force acts by convoluting in any way the wire which connects the two metals. In this way, by increasing the length of the conductor, and so increasing the space and time through which the electro-motive force acts, we can increase, to any extent, the work obtained. And it is in this way, and owing to this peculiar property of electro-motive force, that we can get any amount of work whatever, even from a single grain of zinc. It is strange, but it is true. Scientific men have hitherto (generally, though by no means universally), failed in recognizing this wonderful fact, in consequence of that most fallacious idea of a definite mechanical equivalent of heat. It is surprising how it has grown into a common axiom with scarcely the slightest foundation in fact. Not a few scientific men have asserted, more or less directly that the power to be got from electro-motive force is without limit; but of late years they seem to have been driven out of their position by the assumption of a definite mechanical equivalent for heat and chemical change. I have entered more fully into this question in the January number of the *Quarterly Journal of Science*, but let me here give a single fact which wholly overthrows the supposed action—at least in a practical point of view.

Take three cylinders and pistons; one filled with atmospheric air, another with vapor of water (or steam), and the third with vapor of turpentine. Impart to each a definite number of heat-units or calorics. This amount of heat will produce, say, one unit of work, or will rsise an unit of weight one unit of height by means of the third cylinder and piston; but in the first cylindvr and piston it will raise the same weight ten times as high, and in the second 6·6 times the same height. Of course, it is easy to answer that in the one case it has also expanded vapor of turpentine, whereas in the other cases it has only expanded steam or air, and that this is to be considered as work. But the answer is simple; that if thts be work, it is not work in the ordinary and practical acceptation of the term, namely, units of weight raised units of height.—*Chemical News.*

Steel Tyres.

THE recent disastrous accident at Hatfield, on the Great Northern Railway, resulting from the breakage of a steel tyre, and the fact that a number of such tyres have broken on different lines during the inclement weather of the last fortnight or so, although fortunately without giving rise to fatal results, renders it desirable that the attention of railway managers should be directed to a point of danger connected with the use of such tyres, which does not always receive the consideration it deserves. The point to which we refer is the excessive hardness too frequently given to the steel of which tyres are made. The first steel tyres largely used in this country were those manufactured by KRUPP, and they were tyres made of a far softer kind of steel than is commonly used for such purposes. Experience, in fact, showed that a harder kind of steel could be used with safety, and KRUPP himself has considerably increased the hardness of his tyres since their first introduction. As the tyres of other makers came largely into the market there arose a strong competition which has its effect not merely on the price of the tyres but on the nature of the material of which they were made, the endeavors of the rival manufacturers to obtain a high "mileage" from their tyres, leading them to employ, in many instances, steel of a far harder kind than is advisable on the score of safety.

Railway superintendents are, we fear, frequently apt to attach somewhat too much importance to the power of a tyre to resist wear, and too little to the dynamic strength of the material of which it is made, but we trust that the recent accidents may lead to an improvement in this respect. We have seen steel tyres bent cold so that the opposite sides of the hoop met, and this without showing any sign whatever of fracture; but we believe that but a small proportion of the tyres now made, and most highly commended for their wearing qualities, would stand anything like such a test satisfactorily. It should be endeavored to obtain durability for a tyre by closeness and uniformity of texture, and not by excessive hardness, and it is especially advisable that railway engineers should take more effectual means to ascertain the precise character of the material they employ than is now generally the case,

Another point also to which it is desirable we should direct attention is the excessive amount of shrinkage but too frequently given to steel tyres. The shrinkage which it is desirable should be given to a tyre ought to be determined by two things—namely, the elasticity of the material of which the tyre is composed, and the rigidity of the wheel upon which it is placed. The greater the elasticity of the tyre, and the less the rigidity of the wheel, the greater the amount of shrinkage which may be safely given. When a tyre is in use, a strain is put upon it by the action of centrifugal force; and in the case of a wheel running at express speed, or, say, about fifty miles per hour, this strain amounts to about four tons per square inch of section, it being supposed that the whole strain is resisted by the tyre itself, and not by the fastenings. In shrinking on a tyre, the initial strain put on should be slightly in excess of that produced by centrifugal force at the highest speed at which the wheel is to be run, so that the only effect of the centrifugal force may be to diminish the grip of the tyre on tne wheel, but never to cause the tyre to become loose on the latter, or to put a radial strain on the fastenings so long as the tyre remains unfractured. The amount of excess of the initial tension above that due to centrifugal force, which it is desirable to give to a tyre, will depend upon the material of the latter, and its tendency to become stretched in use. With steel tyres of moderate hardness, the amount of this excess need be very small.

We have said that the amount of shrinkage given to a tyre should depend upon its hardness, and the rigidity of the wheel upon which it is placed; and it is in estimating this latter quantity that the main difficulty in determining the proper shrinkage exists. A steel tyre of moderate hardness and average good quality will, if put upon a perfectly rigid wheel, have an initial strain of about 3½ tons per square inch put upon it for each 1-100 inch shrinkage allowed per foot of diameter. Thus an allowance of 1-50 inch per foot, or, say, 1-16 inch in a tyre of three feet internal diameter, would involve an initial tension of about seven tons per square inch. But in practice there is no such thing as a perfectly rigid wheel, and even with strong wheels of the ordinary construction, the amount by which the wheel would be compressed by the application of the tyre would probably be sufficient to reduce the strain just mentioned to four tons per square inch or less, an amount which is, perhaps, scarcely as great as is required. The above calculation of the strain produced by shrinkage is founded on the supposition that the steel of which the tyre is composed will stretch about 1-1250th of its length for each ton per square inch of tensile strain within the limits of perfect elasticity. If the tyre is composed of harder material, the initial strain put upon it by the shrinkage will, of course, be proportionably greater. The increase which has been made in the hardness of tyres has thus rendered excessive the amounts of shrinkage which were fixed upon when the tyres were made of a softer class of steel. Moreover, the use of steel tyres has led in many instances to the employment of stronger and more rigid wheels than formerly, and this again has been the cause of an increase in the initial tension, due to a given amount of shrinkage. In America, where steel tyres were sometimes applied to cast-iron wheels of a very rigid kind, it has been found necessary to employ much smaller amounts of shrinkage than are usual in this country.

It is a very common thing to ascribe the breakages of tyres which occur in winter to extra tightness caused by the cold; but we consider that the influence of temperature in this way has been greatly overrated. It must be remembered that if the tyre shrinks, the wheel shrinks also, and it is only an excess of the latter shrinkage over the former which can give rise to increased strain. One very important action of the frost is to make the permanent way more rigid, and thus increase the shocks and jars to which the tyres are exposed; and it is in this way, more than any other, that we believe the cold weather increases the number of fractures.—*English Exchange.*

MINING SUMMARY.

Colorado.

SMELTING WORKS.

We learn from the Georgetown *Miner* that the subject of utilizing the lead contained in the silver ores of that section, is attracting a great deal of attention. That paper says: "Already quite a number of our mine-owners are piling up their smelting ores, with a view of shipping them to smelting works at an early day in the coming summer, when the price of freight will be cheaper than it is now. WILLIAM E. GRAY, Esq., a young gentleman who proposes erecting works at an early day, next spring, at Golden, has been here for several months, examining into our mineral resources, furnishes us with the following result of assays for lead and silver, which he has made of ore from the following-named lodes:

South American, per cent. of lead	54
New Boston " " " "	36
Whale " " " "	46
O. K. " " " "	40
Paymaster " " " "	74
Cashier " " " "	40

"The lowest yield in silver was $14 30; the highest, $1,885 in coin, per ton. When we reflect that lead-lodes are worked at a profit that yields only sixteen per cent. of lead, we come to the conclusion that the day is not far distant when the lead in our silver ores will be utilized, and materially increase the value of our bullion shipments. The above facts should be taken into serious consideration by those who are anxious to build up manufacturing towns and construct railways to a point where plenty of freight can be obtained. The lodes above named are capable of furnishing thousands of tons of smelting ore, and, in our opinion, they would be worked on a large scale, if the lead the ore contains could be utilized."

BASE METAL MINES AND RAILWAYS.

The same paper discourses as follows: "It is an undeniable fact that much of the prosperity that is now enjoyed in Utah mining affairs is due to the contiguity of the mines of the base metals to a railroad. Ore that yields $60 per ton, and at the same time containing a large per cent. of base metal, such as lead, is of very little value to us in Colorado; at most we can barely realize $20 per ton for it when delivered at the mill and therefore lose all the lead that may be in the ore. In Utah the value of the lead is paid to the mine. When we consider that low grade ore is generally found in large bodies, and that much of the ore from *any* mining district is of necessity low grade, we can see the propriety of making the other metals besides the silver in the ore, available. There are many lodes in this district that if they be worked for the silver *alone*, will not pay, and yet if Utah prices could be obtained for the ore, mining could be carried on at a large profit. To see the great change made in the affairs of a mining district by a railroad, we know of no better example than in Trinity district, Nevada. In this district is located the Montezuma mine, a vein described as being of an average width of seven feet; the ore contains from $60 to $80 per ton in silver and from 40 to 50 per cent. of base metal, antimony and lead. This lode, prior to the completion of the Central Pacific Railroad, had been worked for the silver *only*. The ore was crushed and mixed with a flux of soda and lime and smelted with charcoal. The resulting alloy of silver, lead and antimony, containing about $200 per ton in silver, was formerly treated in a large reverberatory furnace, the antimony driven off and the lead cupelled. Since the completion of the railroad above mentioned, which runs very near to the works treating the Montezuma ore, the mode of treating the resulting base bullion has been changed. Calcination and cupellation are no longer carried on, but the base bullion is sold, just as it comes from the furnace, $1 per ounce for the silver and $100 a ton for the base metal being realized. The following table shows the results of the present method of treatment:

12 tons of ore daily mined and hauled to mill	$84 00
4 Smelters, 2 at $5 and 2 at $2.50	15 00
2 Engineers, at $4	8 00
5 Laborers, feeders &c., at $3	15 00
2 Cords of Wood at $15	30 00
Limestone, iron, &c	10 00
Charcoal, 144 bushels at 25 cts.	36 00
Total daily labor and material	$198 00
Add for superintendence, office, &c	25 00
Freight, 4.8 tons metal to San Francisco	144 00
Total cost of metal from 12 tons of ore	367 00
VALUE OF PRODUCTS.	
4.8 tons lead antimony at $100	480 00
360 ozs. silver (average contents) at $1	360 00
	840 00
Subtract cost of production, &c	367 00
	$473 00

By an inspection of the above table it will be seen that the silver *alone* did not quite pay expenses, but when the base metal came to be made available a profit was made.

The experience of the Montezuma Company is of interest to very many of us who are owners of lodes containing large bodies of ore, but of a grade so low as not quite to pay the expenses of working when the silver alone is extracted from the ore.

We must make our base metals available before we can hope to have our mining affairs placed on a sound basis, and we want a railroad to enable us to transport the base bullion to a market. A railroad, broad or narrow gauge, is to be our greatest help in the future, and the sooner we get it, the sooner will our mines, many of which now lie idle, be rendered truly profitable.

There are many mines in this county, such as the Paymaster, New Boston, Beecher, Griffith, Comet, Commonwealth, and a host of others, that contain large bodies of ore, rich in lead, with varying amounts of silver, but not quite enough of the latter metal to pay expenses of mining and reduction. These lodes are now lying idle, awaiting the construction of a railroad up the valley of Clear Creek; and also the erection of smelting works at the base of the mountains. There are also other lodes in Clear Creek county that contain silver enough to pay for mining and reduction and at the same time allow of the wasting of the large per cent. of lead contained in the ore; such ore as this should be smelted. The mining industry of this county is sadly in need of railroad communication with the Valley.

THE CARIBOU MINE.

We take the following account of the Caribou mine from the Central *Register* of Feb. 5. It is by far the best, and in fact, almost the only description of the mine we have seen: "At about 30 feet from the surface the crevice splits, one part pitching south, and the other keeping the previous dip of the vein. In the main shaft—now 149 feet deep—the south crevice has been followed, and has gradually widened till at about 125 feet from the surface it is nearly 15 feet between walls. From that point to the bottom of the shaft it gradually narrows to about 5 feet, and shipping ore—which disappeared some 20 feet above—is coming in again. The east shaft—100 feet from the main shaft—has been sunk on the north crevice, and now, at a depth of 71 feet, shows a 10 to 12 inch vein of first-class ore.

"From the second level, ninety-five feet below ground, a crosscut is being run from the main shaft to make the north crevice, with the intention of drifting and stoping upon it. This second level, now 180 feet long, shows a vein of first-class ore nearly its whole length, in some places, very narrow, but again opening out to ten or twelve inches in width. It will be seen that thus far the Caribou mine combines two veins, both large, and both yielding rich as well as low-grade ores. Up to January 1st, 1871, this mine has yielded about 450 tons of shipping ore, worth $76,989, or $171 per ton, nearly. This is good; very good; but I desire to show that the real value of this mine consists, not in its rich ore, but in its large amount of low-grade ore. There are on hand at least 500 tons of fourth-class ore. Then the dump piles contain a considerable amount of equally as good ore, as none of this class was saved until this season. Still, it would be mere guess work to estimate the amount and value. By careful measurement, estimating the crevice above the second level to average two feet in width, there are exposed 34,440 cubic feet of ground yet in the mine above that point ready for stoping at any time without further expense. And from this level to the bottom of the shaft, averaging the crevice at two and a-half feet in width, there are 32,795 cubic feet of ore that can be underhand stoped now, but which would require another level for back-stoping. This total of 67,235 cubic feet at the usual estimate of eleven solid cubic feet to the ton, amounts to over 6,000 tons. The mine now shows, and has yielded a large amount of rich ore, but considering that—as it so often is—of accidental occurrence, and not to be relied upon for any definite time or space, the following seems a sufficiently low statement of the outlook at the Caribou mine: On hand, 500 tons on the dump; 6,000 tons laid open by exploitation of the mine. This will net at least $20 per ton over all expenses.

6,500 tons at $20 per ton	$130,000
450 tons sold	77,000
Production and promise to date	$207,000

"I estimate the net value of the low-grade ore, from carefully-averaged assays, and upon the basis of cheap treatment in a large and well-constructed mill at this place. Should both veins continue as they have heretofore appeared, the total amount of ore now in this mine to its extreme point of development would increase my estimates by at least one half. What other mine of its age—except, of course, huge deposits in limestone, like the Emma, of Utah, can show better results or fairer promises? U. D. O."

California.

MINING MATTERS IN MONO COUNTY.

The correspondent of the *Record* in Bridgeport, Mono county, sends the following mining items: "Operations on the Dunderberg mine have been suspended until improved machinery for amalgamating can be erected at the mill. Mr. NIEDER, the new amalgamator, having worked a few tons by the present apparatus, considers it very impefect. The condition of the roads and the high rates of freight make it almost impossible to procure such heavy castings at this season of the year. Reckon the Sacramento *Union* itself would rather have a branch of the hated Central Pacific Railroad than pay ten or twelve cents per pound freight on heavy machinery."

THE TARSHISH MINE IN ALPINE COUNTY.

The Alpine *Chronicle* of Feb. 4 has the following account of a visit to this mine: "We donned the rig of a miner and followed the Captain through the lower tunnel a distance of 906 feet, at which point the upper and lower works are connected by a shaft, through which an ore-schute has been erected to the 150 feet level above. The lower tunnel is being pushed ahead in order to strike the ore deposit, which is liable to be reached at any moment. This tunnel is now in about 930 feet. We then ascended the shaft by way of short ladders, and at 120 feet we found ourselves where the workmen in the "raise" connected with those in the shaft. The close connection here made is very creditable to Capt. MOORE, who made the survey and superintended the work. Climbing thirty feet further—150 feet above lower tunnel—we landed in the drift from which ore of excellent quality is sent through the schute into the car below. The evidences we here met with of the wealth of this mine well repaid us for the trip up those slimy ladders, with the risk of making a misstep and being sent to where the angels dwell. At our feet lay tons upon tons of the rich ore for which this mine is so famous; and around and above us was a mass of wealth awaiting removal to be converted into the "root of all evil," and it is to be hoped that such conversion will commence during the coming Summer. Both qualities ore—the hard and the soft, clayey—are taken out of this drift. The Company have evidently got into an immense deposit of ore, extending from the point where the connection was made in the shaft to the upper tunnel, a distance of about one hundred feet, and extending into the mountain to an indefinite distance. It is seventy-five feet from this drift to the upper tunnel, and within this space good ore has been extracted at several points. From the upper tunnel the Company have "raised" about 180 feet, at which point they have a body of fine ore, but no work is being done there at present. The Company have an apparatus for concentrating the sulphurets of the soft ore. We think we can safely say that there are few mines, if any, in this State able to make a better exhibit than can the Tarshish. It is well worth a visit, but only honest good-looking counte nances are admitted.

THE GRASS VALLEY MINES.

We learn from the *Union* of Feb. 3, that the Eureka mine has continued its steady yield, amounting to over $2000 per day from the mill, with extensive savings of rich sulphurets which when worked will add materially to the average of the mine. The works underground are in splendid order, and there is ore in sight for a three or four years' run. The Grass Valley Consolidated, or the O'Conner as it is sometimes called, has changed hands and is now under the control of an English company. The new owners will begin immediately to oven up the mine and to work it in the most scientific way. LANDIS & BLACK, of Goshen Hill, about theee miles north from Bough and Ready, will get through with their long tunnel within a week. The tunnel is an immense work and has cost these enterprising min-

ers a great outlay of money. Goshen Hill, the lowest part of which s tapped by this tunnel of over 1000 feet in length, is filled from top to bottom with gravel which will pay by the hydraulic process. On the bed rock it is known that the gravel is very rich, and would pay for drifting. The claims are to be worked by hydraulic process.

NEW YORK HILL MINE

is soon to be reopened, the machinery to be repaired and started to running, arrangements to t hat end having been made in San Francisco.

Wyoming.

THE IRON MINES.

About forty miles northwest of Cheyenne, writes a correspondent of the *Evening Post*, "there is a mountain of almost pure magnetic iron that quite dwarfs the famous Pilot Knob region of Missouri. It is a spur of the Black Hills, shooting up near where the cañon of the Chugwater cuts through the crest of the plateau. It is an isolated peak, a mile long by several hundred feet wide, rising almost perpendicularly two thousand feet above the general surface on the west side, and covered with earth and drift on the east. The ore is stratified and entirely free from rock. The blocks are black, crystalline, and break with a fracture almost like cast-iron. The deposits are immense. An enthusiastic explorer of the region says that 'there is more pure magnetic iron ore in the Black Hills of Wyoming territory, above ground, than all the teams of North America can haul away in a lifetime.' The ore is said to contain seventy-five per cent. of pure iron. Its quality will soon be determined, as a shipment of twenty-five thousand pounds was lately sent to St. Louis to be tested. A local paper, anticipating the result, declares that it will be simply confirmatory of what is already known here, namely, that this iron ore exceeds in its proportion of pure metal any similar deposit of ore anywhere in the world. The Iron Mountain of Wyoming is destined to become one of the most important and valuable possessions in North America. South of Cheyenne important deposits of brown hematite ore have been found. The proximity of these iron beds to the coal mines, and the adaptability of the latter for purposes of manufacture, is likely to make of Cheyenne and Laramie imoprtant manufacturing centres. Each is from twenty-five to thirty-five miles from the Iron Mountain, while the latter is almost in the neighborhood of the purest and most extensive coal-bank."

Michigan.

THE COPPER MINES.

The Portage Lake *Gazette* of Feb. 2 says: "The month just closed on the legitimate working mines of this district, finds them all in thorough working order, and producing their share of copper. At the Hecla-Calumet the product for January is not all up, but we are informed that it will be in the neighborhood of 800 tons. The developments in the south part of the Hecla continue good. After a thorough repairing in every department, the Quincy Stamp Mill got to work on the 21st of January, as was noted in the last issue of the *Gazette*. The necessary repairs to be done to the mill breaking in upon the month of January, the company has not weighed up its product for that time. The underground condition of the mine is highly satisfactory, so we are informed. Our latest advices from the Schoolcraft informs us that everything is going on swimmingly both underground and on the surface. The mines at work on Kewanah Point are going along on the even tenor of their way. From the Central our reports are such as to warrant the belief that the yearly product of the mine will be kept up. Operations on the Copper Falls continues as heretofore, with an assurance that the product of the mine for the present year will not compare unfavorably with the past. We have nothing direct or definite from the Phœnix Mine, but we hope the company are meeting with that success which their indefatigableness deserves. In returning back to our own immediate neighborhood, we do so for the purpose of noting down the achievements of one of the 'gutteds.' The product of the Hancock is even better, by ten tons, than it was last month. The product for January foots up as follows:

Barrel work	15 tons	755 lbs.
Stamp work	24 "	273 "
Making a total of	39 "	1028 "

Kansas.

THE COAL TRADE OF OSWEGO.

The Oswego *Register* has the following:—The coal mines recently opened up on the south border of our town are beginning to assume a magnitude of importance. What is known as the coal field is a broken plain one mile and a half south of town, and comprises an area of over five miles square, reaching to STEEL's farm on the bette, and extending east to the Neosho river. Mr. MCFARLAND, with a force of fifty hands, is working up a surface vein eighteen inches thick, beginning at the bed of a bayou branching from the Neosho. The vein is from eighteen to twenty-two inches thick and from three to six feet below the surface. Mr. STEEL is working up the lower point on the Labette. The distance between these points is five miles. The M. K and T. Railroad have constructed a switch midway, and Mr. MCFARLAND supplies at present from six to ten car loads a day. The coal is pronounced equal to the best in the State. Other parties are mining at various points. The coal bed at no place is over twenty-five feet below the surface. At Mr. DAVIS' farm, two miles below town, and at the farm of Mr. OBERDEAN, on the Labette, three miles west, wells have been sunk, and a second stratum of coal, two feet thick and two feet below the first vein, has been struck. It is thought both these strata can be mined at the same time, and the rock will support the earth without artificial support. In the bed of the Neosho, at Howell & Rathburn's mill, north of the town, there is a superior vein of coal, as is well known, and from which large quantities of coal were taken last summer, when the water was low. The full extent of the coal region is not known. At various points in the bed of both rivers it makes its appearance. Enough is known, however, to make it an object to open up these veins on an extensive scale, and capitalists are preparing to take hold of the enterprise at once.

Venezuela.

GOLD MINES AND BAD FEVERS.

The San Francisco *Scientific Press* publishes the following:

"EDITOR PRESS:—I forward you a copy of a letter from a friend of mine which will explain itself. Mr. W. is well known in Montana and Eastern Nevada. He is English by birth, but American by adoption; a machinist by trade, and an honest and industrious man and excellent mechanic. He is fifty years of age, and went to the country to put up the engine and boiler of a quartz-mill and to run it. He has been engaged in such work for seven or eight years past.

'CARATAL, NUEVA PROVIDENCIA, VENEZUELA, July 10, 1870.

'FRIEND DAHLGREN.—There are only two districts formed as yet—Callao and Panama—with plenty of room for more discoveries. The lodes run northeast and southwest. They are, in fact, a vast network of lodes. Sink where you will, there is gold—not in pockets, but in true quartz-veins. It pays from the start. The quartz is not contaminated with any base metal of any kind, which requires chemical processes and hell-roaring machinery to save the gold. It averges from $35 to $70 per ton, and is readily crushed and saved. The country is very unhealthy on account of fevers and liver complaint. Few whites escape. The country is mountainous and deeply wooded; in fact, impenetrable without cutting a road, inch by inch. We are now passing through the wet season. It rains every afternoon in torrents, and the gulches are impassable. * * * The American mill (twenty stamps) is running, and ships $26,000 monthly. They are adding twenty more stamps (a Chicago mill from the Eagle works). Our heavy pieces cannot cross yet, but all the light pieces are stored in our mill, which is up and enclosed. The mill is a twelve-stamp Howland rotary battery, from MOREY & SPERRY'S, of New York. Were we running, we would be turning out the "bars," sure. We have six months' ore out and hauled, and in *every* portion of the quartz gold is visible to the eye or with the glass. Our success is sure. There is no myth; no humbug. I tell you facts. You would be astonished to see it. All that is wanted are the mills. The ore is here, sure. Plenty of fuel, water; cheap labor and grub. Leave Nevada and come here with a mill—the bigger the better. You would make a fortune, sure. Your old friend,

JOHN S. WILLIAMS.'

"These are the plain facts—plenty of fine gold-quartz and fevers or liver complaint. It is 150 miles back from the Oronoco river, and the port of entry is Bolivar, on that river. It is reached by steamer to San Thomas from New York, in twelve days or so. Three Howland rotary batteries have gone now, of twelve stamps each: and engineers and superintendents are in demand.

"C. B. DAHLGREN.

"SAN DIMAS, Durango, Mexico, November 23, 1870."

Utah.

A correspondent writes as follows from Silver City, January 23, in the Salt Lake *Tribune:* "Being somewhat interested in mines, and having from childhood worked them, in Europe as well as the United States, being one of the mining pioneers of Illinois and Wisconsin, I arrived at Mineral Point and Dodgeville, as early as 1841. In East Tintic and other mining districts of Utah I have been a constant explorer for the last eight or nine weeks. Hitherto, districts would be considered rich, if from one-seventh to one-tenth of the capital invested in prospecting would succeed, so as to be able to pay any dividend, and one lode in fifty a source of permanent wealth to its possessors. Tintic will be an exception to the rule. We are justified in saying, from what we have already developed, that three-fourths of the investments here will produce large profits, so that from a third to one-half will result in permanent wealth to the operators. We will defy competition, not in the richness of the ores, but in their magnitude—in the durability and feasibility of our mines. Our district, from north to south, is fifteen miles, and twelve from east to west. We have not explored this district thoroughly more than three and a half miles in width and six in length; and even that but partially, and have found, on an average, one well-defined ledge in every 300 feet, across that three and a half miles, each one bearing mineral on its surface that will assay from $1,200 to $1,800 per ton in silver; and we have not as yet to our knowledge a ledge that does not produce paying ores. We have hundreds of tons of ore on dump at these shafts; and, if we had but the mills and furnaces, we would, in the coming year, produce more bullion than any other district in Utah. As to its durability, it is a granite formation. Another great advantage we have in Tintic is that all our mines are accessible; there is not a mountain or a cañon that cannot be easily approached with a wagon at any season of the year. The following lodes are worked the whole winter through: Uncle Sam, two shafts; Hidden Treasure, one shaft; the Keepapitchinin, the Eberhart, King William, Joe Bowers, two shafts; Estella, Shoebridge, Austin, Morning Glory. The Pioche company has one tunnel and four shafts running; the Fon du Lac has one tunnel at Superior Hill, striking twelve ledges, one in Black Dragon Hill, cutting three ledges, one drift on the Hamilton lode, one shaft on the Tintic lode and two tunnels on Eureka Hill. Besides, there are in operation, Great Eastern shaft, three shafts on the Black Dragon lode, four on the Sunbeam, the Diamond shaft, the Anthony Wayne shaft, the La Fayette, the Lucky, the Western Union, the Ruby, the Mammoth (three shafts), Eureka (two shafts) and a tunnel being run on the same by Mr. CHAUNCEY WEBB. There are at least a dozen other shafts and tunnels being run with great energy, varying in depth from fifteen to seventy-five feet, with a few down to the depth of 100 feet. Prospecting cuts and holes are numerous. We have three town locations in this district. Silver City, which occupies the central position, has the honor of containing the records and officials. Diamond City is three miles south and has the water, and will yet be the central position for mills and furnaces. Eureka City is four miles north of Silver, and also has its advantages, boasting of a number of rich mines in the immediate vicinity."

New Mexico.

PLACER MINING IN COLFAX COUNTY.

The Cimarron *News* contains the following statistical article, upon the operations of one of the Companies in its locality. "The claims of CARPENTER & Co., adjoining those of the Michigan Company, take in 2700 feet along the course of the gulch, and 600 feet in a side gulch. The work done by this company shows systematic and correct mining; the improvements put up by them are solid, permanent, and to the purpose, and the claim might serve as a model to others. The company started in June, 1867, to open their ground. To strike the bed-rock at the lower line of their claim, they had to make a cut nearly 600 feet long on ground belonging to the Michigan Co., and it was not until July, 1868, that they could commence washing for gold, having expended in the meantime about $10,000 in opening their ground and digging ditches to supply it with water. The ground averaged 16 feet in depth, and takes in the widest part of the gulch, which has here a fall of one in twenty. How wide the pay-streak is, still remains unknown. The claim has beem worked full 150 fcet wide, and still prospects well on either side. The flume is at a grade of seven inches to the box, and consists now of 60 boxes, each 20 inches wide, 24 inches high, and 12 feet long. For riffles, blocks four inches thick are used in all but the last five or six boxes at the upper end. These are riffled by scantling, three inches by four. They make a more effective riffle than blocks, and are handier to take out and put back in cleaning up, than blocks, but must be plated with iron, otherwise they would wear out in a few days. If heavily plated they will last two seasons. The boxes, which are riffled with blocks, are generally cleaned up but once a season, at the close of mining. Water is brought to this claim in Mills' Gulch ditch, and the Big ditch. Last year Mills' Gulch ditch supplied no water, and the company bought 100 inches of water from the Big ditch, at an expense of $1967. The work is done by a hydraulic pipe made of galvanized iron, costing about $2 per foot, and able to bear a great pressure; the last 50 feet are made of strong canvas to make the end moveable and control the direction of the stream of water. The pipe is of heavy sheet copper, and is so fixed that nozzles of different sizes can be screwed on. A nozzle with an aperture of one inch will permit the escape of 20 inches of water; one of one and a half inches about 40, and one of two inches, about 60, the head of the water being in each case 50 feet. Only one man is required for its service, and the work done is, according to experiments made elsewhere, equal to that of five men ground-sluicing, fifteen men with a long-tom, sixty men with a rocker, or two hundred and twenty-five men with pans. By its use water is made useful in two ways; first, in battering down the banks of dirt, and then in washing and carrying it through the sluices. The claim produced in 1868 (one month from the middle of July to the middle of August) $3500; in 1869, $7800, and in 1870, $12,760. The amount of ground worked out in 1868 was equal to a square of fifty feet, and in 1870, one hundred feet. Generally seven men were employed, three in daytime and four at night, each set working ten hours, and receiving board and two dollars and fifty cents per day.

The account for the year 1870 stands as follows:

Wages paid to men for labor	$2,600 00
Cost of boarding	1,059 00
Water bill	1,969 00
Value of quicksilver lost	200 00
Lease money	132 00
Paid for incidental expenses	350 00
	$6,299 00
Value of gold produced	$12,760 00
Leaving a net profit of	$6,461 00

being a fraction over one hundred per cent. on the amount laid out The ground on this claim is of more than average richness. If we multiply the area worked out each year by the height of the ground, sixteen feet, we find the result set forth in the following statement: For 1868—40,000 cubic feet were worked; value of gold produced, $3500; gold in each cubic foot, 8 3¼ cts. For 1869—102,400 cubic feet were worked; value of gold produced, $7800; gold in each cubic foot, 7¾ cts. For 1870—160,000 cubic feet were worked; value of gold produced, $12,760; gold in each cubic foot, 7 96-100 cts. Total—302,000 cubic feet were worked; value of gold produced, $24,660; gold in each cubic foot, 7 96-100 cts., that is, each cubic foot of ground worked in this claim has produced within a small fraction of eight cents, or more than two cents for every pan of dirt, from the very grass roots to the bed-rock. The ground, however, does not pay at a uniform rate, for in one run made in sixty days, $3550 were cleared up, and if all the ground paid at this rate the claim should have produced over $70,000 the last season.

Oregon.

EAGLE CREEK MINES—HOW SPARTA GOT ITS NAME.

We learn from the Baker City *Democrat*, January 28, that "during the past week a number of persons have gone over into the Eagle Creek mines to spy out the land, 'prospect,' and secure mining grounds, etc., etc. Within a few days past, Messrs. BOWEN & CRANSTON, JOHN FURMAN, DAN CONGER and others, with Mr. THOMPSON, local Recorder of the mines, laid off a town on Town Gulch, situated a short distance above the old Kooster Town. Four blocks—four lots in each—were laid off and taken up. The embryo town was christened Sparta, and the lots taken up are all for business purposes. Mr. FURMAN intends to run a stage from Baker City to Sparta as soon as spring opens, and work in the mines fairly begins. There are no supplies in the mines for sale at present. Miners from Auburn and Baker have taken in supplies, it is true; but only enough for themselves while securing ground and prospecting. So far as we can learn, all are well pleased with the country, and will return thither in the spring. All agree that water is all that is needed to open up and develop a rich and extensive mining country. Messrs. BOWEN & CRANSTON will soon have a store-house under way, and goods for sale at Sparta. One of the Chinamen, who has a contract on the ditch, has already gone to Auburn and Granite to engage his men—intending to have 100 men ready to go to work on the ditch, when the snow melts off sufficiently to enable the workmen to see the ground and ditch line, whether that be in March or April next. He will increase his force on the ditch to whatever number of men may be necessary to finish up by the time the flume-work can be completed. Sparta, the new town, is thirty miles from Baker City. The name—Sparta—was selected thus: A wooden top was made, with four sides, each side having a name written thereon, as follows: Augustine, Iboville, Geneva and Sparta. The top was set to spinning, and when it ceased its gyrations, the side on which Sparta was written was uppermost. That settled the question. We commend its founders for giving it this name, instead of one that ends with 'burg,' or 'ville,' or 'city.' The thing of dubbing a point, or place, with not more than a dozen inhabitants, a 'city,' has become so common that it hardly rises to the dignity of a burlesque."

Nevada.

MINERAL HILL.

We learn from the Elko *Independent*, Jan. 21st, that a vast quantity of rich rock is now lying at the Manhattan mill, awaiting crushing process. The mill is now turning out over $2,000 in value of bullion every day, and cannot begin to do the work needed. More mills are wanted immediately. There are no idle men at Mineral Hill, and a limited number of new hands could find work.

BIG VALLEY MINES.

The *Sage Brush*, of the 14th ult., has the following in regard to the new mining district north of Susanville; "Messrs. NEAL and GOLDSTEIN returned from the new mines this week. They bring more flattering news from there than ever before. Ore taken from twenty-five feet below the surface prospects fabulously rich in both gold and silver, and the leads seem well defined. Extensive arrangements are being made for a thorough test of that country, and many old miners who have been there believe it to be of precisely the same character as Gold Hill, in Nevada."

TWO MORE FURNACES.

According to the Eureka *Sentinel*, "the Eureka Consolidated Company has commenced the grading of a site for two immense furnaces, immediately north of their present works. Two furnaces are to be built at once, each of the capacity of forty tons of ore per day. These, with the three already running, and consuming forty tons of ore per day, will reduce 120 tons daily to bullion."

MARKET REVIEW.

The Coal Trade.

NEW YORK, Feb. 17, 1871.

WHOLESALE.—Business has been very irregular and unsteady during the past week, which must necessarily be the case where so many different opinions exist in regard to the present difficulties. The small amount of coal in this market makes it hardly necessary to speculate upon it, but the probable supply hereafter is discounted and rediscounted, and business has been done in all sorts of ways during the week. No doubt many orders have been kept for coal predicated upon the prospects of resumption; in fact, we know of cases where parties who were sanguine that the 1st of March would see us with all the coal at our disposal that we required, have actually booked orders at $2 00 per ton less than the market price of today. We all know that the one-sided conditions upon which coal is sold, do not guarantee the delivery, but this example shows the excitement which prevails generally.

As we stated (on belief) last week, operations were not resumed on Wednesday last, the 15th inst. A few single collieries scattered here and there have begun mining, but we doubt if the transportation companies will furnish any facilities for bringing it to market. It does not pay to reorganize their transporting facilities for so small a tonnage. Not only that. The meeting of the representatives of the several mining and railroad companies which we announced would take place on Tuesday, duly convened at the office of the Delaware, Lackawanna and Western Railroad Company, corner of Exchange place and William street. Among those present were the following:—ASA PACKER, Mr. SAYRE, of Lehigh Valley Railroad Company; Mr. GOWEN, President of Philadelphia and Reading Railroad Company; Messrs. PARDEE, FEEL. LINDERMAN and COXE, committee of coal operators of Lehigh region; DAVID THOMAS, SAMUEL THOMAS, representing Lehigh Iron Furnaces; Messrs. BUSHING, ECKERT, KAUFFMAN, representing Schuylkill County Iron Furnaces; Messrs. BORDA, SIEGFRED, KENDRICK, committee of coal operators in Schuylkill county; Mr. DICKSON, President of Delaware and Hudson Canal Company; Mr. EWEN, President of Pennsylvania Coal Company; Mr. HOYT, Treasurer of Pennsylvania Coal Company; Mr. CLARK, President of Lehigh Coal and Navigation Company; and Messrs. SLOAN, BRISBIN and PYNE, of Delaware, Lackawanna and Western Railroad Company.

These parties represent a capital of some hundred millions of dollars. As we stated in our last issue, this adjourned meeting was held to take in consideration any offer that might come from the Miners' and Laborers' Benevolent Association (W. B. A.) and which it was understood would be promulgated in their organ (*The Anthracite Monitor*) on Saturday last. The following is the order as we extract it from the minutes of their meeting:

"The question of resumption of work was then brought up. After considerable discussion, several motions and amendments being offered and withdrawn, it was decided, on motion of W. H. WILLIAMS, that all the counties shall resume work on the fifteenth (15) of February, 1871." Which was decided by yeas 26, nays 5.

The above order of the association being merely a resuming of work on last year's terms, is not considered satisfactory by the above represented capital, and it is maintained that it is their interest to oppose the combination of miners and laborers, for the purpose of putting an end to these periodical suspensions and strikes. These capitalists have made up their mind that the control of such an immense interest is no longer safe in the hands of their workmen, and are going to make an effort to rid themselves of them. They also claim that a uniform rate of prices can be maintained for coal, thereby making the business less hazardous. It is now therefore "war to the knife," and we may expect a long and bloody conflict. The above will not be news exactly to our readers, for we forewarned them weeks ago that it was probable that some difficulty of this class would arise. The operators have for a long time worn this yoke of the miners, and laborers, association, and it has always chafed them severely and been a great source of annoyance and trial to them. Being men of wealth, they naturally hate to bow their necks and humble their pride to their employees, and many of them would rather risk every dollar they own than longer submit to it, now that they have been able to include in their number the principal transportation companies.

It seems to us that their position is most formidable. This war will bring out the whole strength of both parties, and it may in its progress involve our entire manufacturing interests. It may also be carried on to such an extent and create such a famine in coal that our legislative bodies may deem it necessary to interfere, and the military be called into requisition for the protection of life and property. We hope, however, a calm, cool, deliberation will characterize the action of all parties, and no "marry in haste and repent-at-leisure policy" will be adopted. It has been patent to us for a long time that the series of small suspensions and strikes that we have had for a number of years back, were but forerunners of a final terrible conflict, and we confidently believe that it is this that we are on the eve of. It is but another phase of the old war of Capital vs. Labor, the relations of which as yet have never been thoroughly solved. The history of this suspension is too well known to our readers to need a repetition here. We have faithfully kept them informed from its inception to the present time. The immense surplus of coal which was rolling up in consequence of extended producing facilities caused a gradual decline in prices, which so alarmed the miner and laborer that they thought themselves justified in suspending, in order that a fair rate of remuneration might be maintained. The only apparent way to accomplish this was to cut off the production and use up the surplus. The necessity of this was more practically demonstrated, when the several large companies, in consequence of a heavy decline in prices, found it necessary to reduce miners' and laborers' wages some forty per cent. We are not going to set ourselves up as a judge whether the miner and laborer is worthy of his hire or not. Certainly the calling is laborious and extra hazardous to life and limb, as the memories of the Avondale Disaster will bring to the recollection of our readers. The representatives of the large companies claim that at the reduced wages offered a common laborer (assistant to the miner) can earn from $1 75 to $2 a day, while the miner himself earns from $3 to $5 per diem. This, certainly, is extraordinary pay, and ought to be entirely satisfactory, and no doubt is to a great many of them; but these 30,000 men claim farther that they should fix the price of their own labor and be hired on a certain *basis*, which increases their pay as coal advances, and this admits them into a certain kind of partnership with their employers. In other words, they want a share in an increased price that may be effected by an accident or corner that may run up the price in the market. Their employers disclaim the idea of a partnership of any kind, and refuse to operate the mines on any *basis*. This is the cause of our present trouble, and is the point upon which the war is to be waged.

PRICES.—As we have remarked in previous numbers of the JOURNAL, the price of coal depends entirely upon the length of the strike. The various large companies and operators in the regions have not mined any coal since December 1st; at that time we had some 500,000 tons on hand at the various shipping points; during the past ten weeks this must have been materially reduced, and probably 50,000 tons of coal is all that could be raked, and scraped together now.

Next week we shall speak of the relative position of the Cumberland, or soft coals, to the anthracite, and to what extent they are, and can be used, in the absence of the latter.

RETAIL.—The retail trade has improved during the past week, and better prices have generally been realized, in consequence of the large companies having sold out their supply which they were offering at $6 to $6.50, while other dealers were asking $7.50 to $10.

FREIGHTS.—Our ice bound rivers and bays prevent the shipping of coal and make it very dangerous. Freights for near by shipping points range from 45 to 60 cents.

LATER NEWS.

Since the above was in type, as an evidence that Transportation Companies are at least in earnest, we have received the following rates of advanced tolls:

OFFICE LEHIGH VALLEY RAIL ROADCOMPANY.

MAUCH CHUNK, February 16, 1871.

The rates of Freight and Tolls on Coal transported on and after this date until further notice will be as follows:

FROM PENN HAVEN.

To Mauch Chunk	57 cts.
" Leighton	73
" Parryville	81
" Carbon Iron Company	81
" Kittatinny	93
" Lehigh Gap	$1,01
" Slatington	1,09
" Rock Dale	1.25
" Laury's	1,37
" Spring Mill	1,41
" White Hall	1,45
" Coplay	1,53
" Ironton R. R.	1,53
" Lehigh Valley Iron Co	1,53
" Hokendauqua	1,57
" Thomas Iron Co.	1,57
" Catasauqua	1,61
" Lehigh Crane Iron Co	1,61
" Catasauqua Manufacturing Co.	1,61
" Fullerton	1.65
" East Penn. Iron Co.	1,65
" Car Wheel Manufacturing Co	1,65
" Frederick & Co.	1,65
" Furnace	1,69
" Allentown Iron Co	1,69
" Lehigh Rolling Mill Co.	1,69
" Allentown Rolling Mill Co.	1,70
" Roberts Iron Co.	1,71
" Allentown	1,73
" Hope Rolling Mill Co.	1,73
" Glen Iron Co.	1,73
" Lehigh Iron Co.	1.74
" North Penn. R. R.	1,93
" Bethlehem	1,93
" Lehigh Zinc Co.	1,93
" Bethlehem Iron Co.	1,93
" Freemansburg	2,05
" Coleraine Iron Co.	2,17
" Glendon Iron Co.	2 33
" South Easton	2,37
" Easton	2,41
" Phillipsburg	2.41
" Warren F undry	2,45
" Andover Iron Co.	2,49

TIDE RATES.

Penn Haven to Mauch Chunk	32 cts.
Mauch Chunk to Phillipsburg	$1,84
Phillipsburg to Elizabethport	2.69
" " Port Johnston	2 72
" " Newark	2 84
Penn Haven to Port Johnston	4,88

ASA PACKER, President.

OFFICE CENTRAL RAILROAD OF NEW JERSEY,
General Office, 119 Liberty street,
New York, Feb. 15, 1871.

NOTICE TO COAL SHIPPERS.

(No. 2.)

On and after Thursday, February 16th, 1871, tolls on coal shipments from Penn Haven will be charged as follows, exclusive of wharfage and shipping expenses:

From Penn Haven to Phillipsburgh	$2 16
" Mauch Chunk "	1 84
" Phillipsburgh to Elizsbethport	2 69
" " to Port Johnston	2 72
" " to Newark	2 84
" Penn Haven to Port Johnston	4 88

R. E. RIKER, Supt.

SAML. KNOX, Secy.

Thus a ton of coal shipped from Ashley, which is at the foot of Wilkesbarre Plain, would cost to bring to market, $6 95, viz.:

From Ashley to Penn Haven	$1 72
" Penn Haven to Mauch Chunk	0 32
" Mauch Chunk to Phillipsburgh	1 84
" Phillipsburgh to Port Johnston	2 72
Shipping expenses and wharfage	0 35
Total	$6 95

The Reading Railroad, we understand, have doubled their tolls, making the route from Port Carbon to Philadelphia $4 instead of $2. The above is the maximum of the rates the transportation companies are permitted to charge in accordance with their charters. As common carriers, they are bound to receive and transport such amounts as may be brought to them.

The above may be regarded as almost prohibitory rates, as coal must sell in this market at from eleven to twelve dollars per ton to pay such freight, and to allow for commissions and other expenses.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Feb. 11, 1871, compared with week ending Feb. 12, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
Phila & Reading R. R.	28,457	413 735	9,088	531.315
Schuylkill Canal		34 373		36 225
Lehigh Valley R. R.	34,929	476 750	1.55	335,115
Lehigh & Sus. R. R.	11,608	105,139	1,28	57,110
Lehigh Canal	....	....	....	.....
Scranton North	9.615	72,856	.....	.....
" South	19.78	176,77	....	....
Penn. Coal Co., rail	11 19	100,21	69	2,760
" " " canal	....	....	....	....
Del. & Hud. Canal Co., East	9.06	66,(3)	2,502	48,332
" " West	804	11,127	134	12,721
South	3.56	16 490	....	....
Shamokin	4.9	30,597	3,976	33,158
Trevorton	515	2 4	....	....
Lykens Valley Coal Co.	....	723	1,845	9,731
Wyoming South	....	....	....	....
Wyoming North	....	....	....	....
P. N. Y. C. & R. R. Co.	2,301	40,942	....	....
Williamstown, Coal'y	4,011	18,096	....	....
Big Lick Col	....	..	2,281	11.160
Total	144.19	1,563 984	22,725	1,077,627
1870	22,725	1.077 627		
Increase week and yes	121,471	491,357		

* Less coal transported for Company's use and Bituminous coal.

†Closed for the season.

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Feb. 11, 1871, compared with week ending Feb. 12, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.		51,384		69,874
C. & O. Canal				
H & B. T. R. R.	2,870	18.440	4,515	24,646
Harrisburg & D.	4,816	61,459	7,675	46,403
L. V. R. R.		2,559		2,639
P. & N.Y. C. & R. Co.	2,525	33,914		30 084
ncrease				

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending February 11, 1871, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	1,263 99	66,707 06
" Hazleton	50 15	20.,191 15
" Upper Lehigh		442 06
" Beaver Meadow	59 17	65,695 12
" Mahanoy	810 14	52,617 00
" Mauch Chunk	152 12	1,115 16
Total Anthracite	2,337 07	392,469 15
Bituminous Coal from all sources		2,639 00
Total by rail and canal	2,337 07	395,108 15
Same time last year	43,446 11	535,250 11
Increase		
Decrease	41,109 04	140,141 16
Forwarded East from M'h Chunk by rail	1,550 10	335,115 19
Same time last year	38,929 18	476,750 11
Increase		
Decrease	37,379 08	141.634 12

RECAPITULATION.

Forwarded East from M'h Chunk by rail	1,550 10	335,115 19
To N. C. R. R., at Mount Carmel		18 00
Forwarded North from L. & B. Junction	216 16	32,724 05
To L. & S. R. R. at Packerton for rail		1,837 02
Delivered at M'h Chunk		311 16
Delivered on line of road above Mauch Chunk	25 12	2,610 00
Delivered above M. Chunk for use of L. V. R. R.	544 09	10,266 02
To L. & S. R. R., at P'n Hav., for railroad		94 10
Do. for canal		7,060 19
At M. Chunk for canal		2,451 02
Total Anthracite	2,337 07	392,469 15
Bituminous Coal		2,639 00
Total all kinds	2,337 07	395,108 15

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending February 11, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	69 05	2,760 14	11,319 01	100,214 08
" Canal				
Total	69 05	2,760 14	11,319 01	100,214 08
Decrease 97,453 14 tons.				

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad, Saturday, Feb. 11 1871;

From St. Clair	
" Port Carbon	742 06
" Pottsville	106 09
" Schuylkill Haven	528 16
" Auburn	2,185 03
" Port Clinton	5,566 09
" Allentown and Alburtis	
" Harrisburg and Dauphin	7,675 02
Total paying freight	16,763 16
Coal for Company's use	1,267 05
Total for week	18 031 01
Previously this year	489,250 14
Total	507.281 15
To same time last year	512,441 18

Delaware and Hudson Canal Company.

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending February 11, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal		
By Railroad East	2,502 00	48.333 00
" West	134 00	12,721 00
" South		
TOTAL TONS,	2,636 00	61,053 00
For the same period last year.		
By Del. and Hud. Canal		
By Railroad East	9,963 00	66.030 00
" West	894 00	11.127 00
" South	3,367 00	16,.80 00
TOTAL TONS,	13,234 00	93,6 7 0

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, February 11, 1871.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB VAL. BRANCH.

	Tons.	Cwt.
From St. Clair		
" Port Carbon	742 06	
" Pottsville	106 09	
" Schuylkill Haven	528 16	
" Pine Grove	1,387 18	
" Tamaqua	5,5 6 00	
" Harrisburg		
" Dauphin	1,860 18	
Total	9,882 08	

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	41 06
" Shamokin	1,128 13
" Herndon	
Total	1,170 01

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	616 00
" Lebnaon & Pine Grove Branch	193 14
Total	810 03

CONSUMED ON LATERALS.

From Frackville Scales	
" Mill Creek "	160 01
" Schuylkill Valley Scales	86 03
" Mt. Carbon "	811 00
" Cressona "	86 19
" Pine Grove "	19 08
" Tamaqua "	88 14
" Shamokin "	
" Trevorton "	
Total	1,222 05

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	
" " Alburtis "	
" " Plymouth R. R. G. & N. Br.	
" " Connecting R. R. "	
" " Willow Street R. R.	30 00
Total	30 00

BITUMINOUS.

From Harrisburg	6,114 03
" Connecting R. R., G. & N. Br.	
" Junction R. R.	264 11
Total	6,378 14

COAL FOR COMPANY'S USE.

Anthracite	242 10
Bituminous	1,125 08
Total	1,367 18

RECAPITULATION.

	Total for Week.	Corresponding week last Year.	Increase.
Passing over Main Line and Leb. Val Branch	9,882 08	32,438 08	
For Shipment by Canal	—	—	
Shipped Westward via Northern Central R. R.	1.170 01	3,671 08	
Shipped West or South from Pine Grove	810 03	532 01	278 02
Consumed on Laterals	1,222 05	2,216 17	
Lehigh and Wyoming Coal	30 00	101 12	
Total Anthracite paying fr'gt	13,114 17	38,963 04	
Bituminous	6,378 14	3,558 17	2,819 17
Total of all kinds paying fr'gt	19,493 11	42,522 01	
Coal for Company's use	1,267 18	1,191 09	148 09
Total Tonnage for Week	20 761 (s	43,713 10	
Since Dec. 1, 1870	591.365 13	567 074 16	24.290 17
Total to date	612,127 01	610,788 06	1 338 16

SHIPPED BY CANAL

	Total for Week.	Corresponding week last Year.	Increase.
From Schuylkill Haven	—	—	—
" Port Clinton	—	—	—
Total Tonnage per Week	—	—	—
Since Dec. 1, 1870	—	—	—
Total to date	36,225 17	34,373 16	1,852 01

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending February 11, 1871—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1871. tons cwt.	WEEK 1870. tons cwt.	YEAR, 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	1074 07	8545 10	39192 18	79597 18
Upper Lehigh Region		649 19	4614 06	3858 11
Mahanoy Region		113 00	704 05	583 11
Hazleton Region			1043 03	
Beaver Meadow Region			1543 00	
Freeckow Region			1043 03	
Mauch Chunk Region	716 16	3183 19	15490 04	28463 13
Totals	1791 03	12462 08	61044 16	112473 13
Increase				
Decrease	10671 05		51428 17	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	1289 09	11608 14	57110 08	108039 08
Forwarded East of Mch Chunk by Canal				
Delivered at and above Mauch Chunk	510 14	579 10	3934 08	3587 04
Delivered to L. & B. R. at PlymouthBridge		274 0		847 03
L. V. R. R. at Sugar N.				
Totals	1791 03	12462 08	61044 16	112473 13
Of the above there was transported on acc'nt of L. C. & N. Co.	716 16	4038 06	16726 11	32337 07
W.-B. C. & I. Co.	68 1.	3538 16	30958 18	34356 08
Totals	630 08	7577 02	47685 09	67183 15
Increase				
Decrease	6791 11		18998 08	

Company Coals.

February, 1871.
No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches
Scranton at E. Port	—	—	—	—	—	—
Pittston at Weehawken	—	—	—	—	—	—
Lackawana at do	—	—	—	—	—	—
Wilk'b're at Hoboken	—	—	—	—	—	—
Old Co. Lehigh at Pt. Johnston	—	—	—	—	—	—
Lehigh at E. Port	—	—	—	—	—	—

For freights to different points, see "Freights."

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, February 18. R. A.	W. A.	AT PHILADELPHIA, February 17. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$— —	— —	— —
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	— to —
Egg	— to —	— to —	— —	— to —
Stove	— to —	— to —	— —	— to —
Chestnut	— to —	— to —	— —	— to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	— —	— —	— —	— —
Stove	— —	— —	— —	— —
Chestnut	— —	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 8 00		— —	— —
New England	"		— —	— —
Locust Dale	W. A. 7 50		— —	— —
Honey Brook, Leh'h	W. A. 7 50 to 8 50		— —	— —
Spring Mountain	" " 7 50 to 8 50		— —	— —
Sugar Creek	" " 7 50 to 8 50		— —	— —
Sugar Loaf	" " 7 50 to 8 50		— —	— —
Old Comp'y's	" " 7 50 to 8 50		— —	— —
Cross Creek	" " 7 50 to 8 50		— —	— —
Room Run	" "		— —	— —
Girardville	" "		— —	4 75
McMichael	" "		— —	4 75
Shamokin	" "	7 50	5 25	— —
Lykens Valley	" "	— —	5 75	— —
Broad Top	" "	7 50	— —	— —
Hill & Harris	" "	— —	4 75	— —
Henry Clay	" "	— —	5 00	— —
Powelton	" "	7 50	— —	4 75

*Dealers in these coals may be found in our advertising columns.]

Prices for Coal at Mauch Chunk.

February 1871.

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein	f.o.b. at Phila.	$5 00
Lemon	" "	4 75
Cumberland Vein Coal	" "	4 75
Consolidation Coal Co.'s on board	N. Y.	7 00
Maryland Coal Co.	" "	7 00

Prices at Baltimore—February, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 80@—
Pittston and Plymouth, do	5 60@5 75
Shamokin Red or White Ash, do	—@6 00
Lykens Valley Red Ash, do	5 25@—
Zerba Valley	5 25@—
Treverton	6 00@—
By retail, all kinds per ton of 2240 lbs.	7 25@8 25
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 60@4 75
Fairmount and Clarksburg gas, f. o. b. at L. Point	6 00@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

February, 1871.

George's Creek and Cumberland f. o. b. for shipping..$4 40

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@5 50
Lykens Valley	— —@6 25
Shamokin Red or White Ash	— —@5 75
Trevorton and Zerba Valley	— —@6 00

Prices of Gas Coals.

February, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 41-43 Pine st., N.Y.
Duty, $1 25, gold.

	Coarse.	Slack.
Block House	$1 75	@- 75
Gowrie	— —	@- 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 75	@- 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 75 @8 00
Fairmount Gas Coal Co. of N. Y.	7 50 @— —
Despard Coal Co.	$7 50 @— —
Penn.	7 75 @8 00
Newburg Orrel Gas	— — @— —
West Fairmount Ga Caoal	8 00 @— —

AT PHILADELPHIA.

Powelton	$7 80

Prices of Foreign Coals.

February, 1871.

Duty $1 25 per ton.
Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@— —
" " Cannel	11 50@12 50
" House "	—@16 00
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel	18 00@20 00

Per ton 2,000 lbs. delivered.

Foreign and Provincial Freights.

February, 1871.

Closed for the Season.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s @16. ton

TO NEW YORK.

Provincial

Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Rates of Transportation to Tide Water.

Closed for the Season.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon	$2 00
Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry.	

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 84
C. R. R., N. J., Easton to Elizabethport	1 21
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 40

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R. or L. & S. R. R. from M. C. to Easton	$ 84
C. R. R., of N. J., Easton to Pt. Johnson	1 24
Shipping expenses	25
Warfage	10
Total	$2 40

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 84
Morris & Essex R. R. Easton to Hoboken	1 36
Shipping expenses	25
Warfage	10
Total	$2 55

TO SOUTH AMBOY.

L. V. R. R.	84
B. & D. R. R. / Cam. & Am. R. R.	1 14
Shipping Expenses	25
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	84
C. RR. of N. J. Easton to Elizabethport	1 21
Shipping expenses	25
Wharfage	10
Total	$2 40

Freights.—February, 1871.

TO EASTERN PORTS.	From Philadel'a.	From E. Port and Port Johnston.	From Newburg...	From Rondout...
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 30	1 75		
Boston	2 .0	1 65		
Bridgeport	1 75	1 00		
Bristol	2 00	1 40		
Cambridgeport	2 75	2 00		
Derby	2 00	1 20		
Dighton	2 30	— —		
East Cambridge	2 35	2 00		
Fall River	2 50	1 40		
Hackensack	1 75	1 00		
Hartford	2 00	1 50		
Jersey City	1 4	60		
Middletown	2 25	1 25		
Mystic	— —	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 90	1 00		
New London	1 75	1 25		
Newport	2 00	1 40		
New York	1 35	60		
Norwalk	1 80	1 00		
Norwich	2 00	1 30		
Pawtucket	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	2 00	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	1 40			
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cockaackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Saugerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

METALS.

NEW YORK, February 15, 1871.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, 7 ℔ ton; Polished Sheet, 3cents ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, 8 per ton,

	Store Prices.
Pig, Scotch No. 1, ℔ ton	29 00@33 00
Pig, American, No. 1	30 00@— —
Pig, American, No. 2	28 00@29 00
Pig, American, Forge	27 00@28 00
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00

	Store Prices, Cash.
Bar, Swedes, ord'y sizes, less 5 ℔ ct.	— —@110 00
Bar, Refined " "	74 00@ 79 —
Bar, Common " "	70 00@ — —
Scroll " "	97 50@125 —
Ovals and half-round " "	97 50@125 —
Band " "	92 50@ 95 00
Horse Shoe	95 —@ — —
Rods, ⅝ to 3-16 inch " "	82 50@ — —
Hoop " "	102 50@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to Nos. (gold)	10½@—11
Sheet, Single, D. and T. Common	—4½@— 6
Sheet, Galv'd, Nos. 14 to 26 10 and 12c. Nos. 27, 28, and 29, 13@14	
Rails, English (gold), ℔ ton	56 00 @58 00
Rails, American, at Works in Pa.	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3¼ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 16 @— 17
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	— @— 37
Copper, Old Sheathing, &c., clean	19 @— 20
Copper, Chili Pig	— @—
Copper, American Ingot	22 @— 22¼
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2¾ cents ℔ lb.

Galena, ℔ 100 lbs.	$— @— —
Spanish (gold)	6 20 @6 25
German, do.	6 27 @6 25
English, do.	6 20 @6 50
Bar (net)	— — @8 75
Pipe (net)	— — @10 25
Sheet	— — @10 25

Colwell, Shaw & Willard Tin-Lined Pipe 15 cts. ℔ lb.

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25 ad val.

	Gold ℔ lb.
Banca	39 @—
Straits	33¾@33½
English	— @33

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 75 @9 00	$10 00 @10 50
I. C. Coke	7 37½@7 75	8 37½@ 8 75
Coke Terne	6 23 @7 25	7 00 @ 8 00
Charcoal Terne	7 75 @8 25	8 75 @ 9 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ℔ lb.

	Gold.
Plates, Foreign ℔ 100 lbs.	$5 87 @ 12½
Plates, Domestic ℔ lb.	8¼ 11½

REMARKS.

IRON.—Scotch Pig continues in limited request, and prices still have a declining tendency; 200 tons Glengarnock sold, to arrive, at a price under $30. There has been less disposition to purchase American, dealers generally awaiting the result of the resumption of work at the coal mines before buying to any extent—holders, however, maintain their advanced views—1,000 tons No. 1 Poughkeepsie, sold at $29 50, 5 mos., at Poughkeepsie. We quote for other brands, No. 1, $30; No. 2, $28; and Forge, $27@$28. Rails are in moderate request at quoted rates—100 tons old Double-Headed sold on private terms. Refined Bar has been more quiet than usual, the impassable state of the streets contributing to the result.

LEAD.—Pig remains very quiet, and we hear of no sales; we quote, as before, say ordinary Foreign, $6 20 @ $6 25, gold. There is no change in manufactured—we quote Bar 8¾c., and Sheet and Pipe 10¼c., less 10 ℔ cent. to the Trade—Tin-Lined Pipe 15 less 2c. to the Trade.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quoted rates. In Ingot there has been more business, but at prices in buyers' favor. The sales are 250,000 lbs. Lake at 21½ @ 22½ cents, and 50 @ 60,000 lbs. do., in lots, 22¼ @ 22½, the latter price now generally demanded. Baltimore and Tennessee nominally 22 cents.

TIN.—The market for Pig is at a stand, and, in the absence of business, prices are nominal at 33½ cents gold for Straits, 33 for English, and 39 for Banca. Since the considerable business in Plates, noted in our last, the market has been quiet, though prices remain firm. The sales have been confined to 4 @ 500 bxs. Charcoal Tin at $8 75 for I. C., and small lots I. C. Coke, 10 by 14, $7 50, all gold.

SPELTER.—The stock of Foreign is light, and the market is rather firmer. Foreign, 5½ @ 6½ cents, gold; Sheet Zinc, 8½ @ 9 cents; Zinc, White Dry, 10 @ 10½ cents; Am., 9 @ 12 cents; 15 tons Missouri Zinc Co. sold at 6½ cents gold; and 25 do. American Zinc Works, 8½ (currency) cash.

MANGANESE, highest grade, in needles, 6 cents; very superior, 5 cents.

STEEL.—All descriptions are steady at our store quotations.

San Francisco Stock Market.

[By Telegraph.]

SAN FRANCISCO, Feb. 14, 1871.

	Feb. 14,	Feb. 2.
Savage	38½	45¼
Yellow Jacket	41½	41
Kentuck	—	33
Cholla Potosi	75	No sales.
Gould & Curry	40	45½
Belcher	13¼	9⅞
Imperial	5½	6
Amador	No sales.	3d3
Crown Point		—
Hale & Norcross		—

The Slate Trade.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square	$6 50@ 7 00
" green, 1st " "	6 50@ 7 00
" red, 1st " "	15 00@16 00
" variegated, "	5 75@ 6 20
" b'k and d'k blue, 1st qual., "	6 00@ 7 05

Loon Creek Again.

THE Idaho *Statesman* has lately seen parties from Loon Creek, who report that recent prospects have been obtained there which bid fair to make Loon Creek a better camp than appearances indicated after the operations of last summer. They say that excellent prospects have been obtained in the long bar on which the town of Oro Grande is built. About one hundred white men and seventy-five Chinamen will winter there. The most of these will spend the winter in prospecting. There is a strong probability that before the spring opens parties will find the lost-pay streak in Loon Creek. If they do, we may look for a bigger stampede there this summer than ever before, and large returns from there of gold.

Rapid Growth of Timber.

THE statement made by our Lane county correspondent relative to land in Oregon, which twenty years ago was prairie, but which now is covered with a young and vigorous growth of timber, is one which would be apt to strike a stranger with surprise. Yet such is the fact. We have no doubt that since the settlement in the Willamette Valley by white people, the area of timber land, instead of decreasing, has actually been increasing. For one acre denuded of its forest by the settlers in our timber land, two acres of prairie have doubly been covered with a thick and thrifty growth of young timber. It is, indeed, astonishing to witness the steady encroachments made upon our prairies by the ever-advancing forests. We have noticed the same fact in the Tualitan plains, which is spoken of by our correspondent. Land which twenty years ago was prairie, is now covered with a heavy growth of young timber.—*Oregon Herald.*

Submarine Blasting.

THE following sketch of blasting operations under water, incident to the sinking of the East River bridge caisson, was written by Mr. F. COLLINGWOOD, and read at the meeting of the American Society of Civil Engineers:—In excavating for the foundation of the Brooklyn pier of the East River bridge, the bottom was found to have, running about through the centre of the excavation, a ridge of exceedingly hard material, being composed of boulders of all sizes imbedded in compact clay. As the dredges would scarcely scratch the bottom after this was reached, the following method of loosening it was adopted. A solid iron pile, 18 feet long and 5 inches in diameter, shod with steel, with a ring at the upper end for hoisting, was driven by an ordinary pile driver down to the desired depth. On withdrawing it it was found that a perfect hole was left, into which a tin canister containing 13 pounds of powder was easily inserted. The effect of the charge was to leave a crater reaching at the centre below the desired bottom. The success of the experiment was so decided that another pile of 5 inches diameter and 22 feet long, and one 6 inches diameter and 22 feet long, were procured. By the aid of these, with two pile drivers and crews, and a diver and assistants, from 20 to 40 blasts per day were fired, at a depth of 18 feet below mean high tide. The dredge was able (after the bottom had gone over in this way) to excavate from 50 to 120 yards per day. The material was from 2 feet to 8 feet deep. Time of driving, about 5 minutes. Cost, probably about $3 to $4 per cubic yard.

Mining Claims.

THE following communication from Commissioner WILSON to Congressman SARGENT will explain itself:—

DEPARTMENT OF THE INTERIOR,
GEN'L LAND OFFICE, Dec. 2d, 1870.

Hon. A. A. SARGENT, House of Representatives:

SIR—Referring to the subject of your letter of 30th ult., I have the honor to state that it is held by this office that, in cases where there is no conflict, the testimony as to occupancy, possession and working of the claim, posting of notice and diagram thereon, and publication of notice in newspaper, may be in the form of affidavits verified under seal by any officer authorized to administer oaths within the land district where the claim may be situated, as authorized by the 14th section of the Mining Act of July 9th, 1870; and it is the duty of the local land officers in such cases to receive such testimony and transmit it to this office with the other proofs in the case, the same as if it had been taken before themselves—unless they have good reasons for doubting its sufficiency or the credibility of the deponents.

With great respect, your obedient servant,
JOS. W. WILSON, Commissioner.

Antimony Mines.

WE mentioned yesterday that a car-load of antimony aarived by freight train from Mill City, Nevada. Antimony is a metallic ore consisting of sulphur combined with a metal. It is a blackish mineral, hard and brittle, and full of long, needle-like striæ. It is found in France, England and America. The pure metal is of a greyish or silvery white. By exposure to air, its surface becomes tarnished, but does not rust. It is much used in the manufacture of concave mirrors, giving them a finer texture. It is also used in bells, the sound of which is rendered clearer thereby, and it also forms one of the principal ingredients in the composition of which type-metal is made, giving the types their firmness and smoothness. It is also used in compounding chemicals, and is of a poisonous nature if taken internally. The car-load referred to as having come from Mill City is the first we have heard of having come from that section, so rich in metals of various kinds; nor do we know of the extent of the mine from which it was taken. We presume it will be worked up in San Francisco laboratories and dealt out in various compounds from drug stores, etc.—*Sacramento Bee.*

Copper Plates.

IT may be of some importance to quartz mill owners, says the Grass Valley (Cal.) *Union*, to know of a liquid that will dissolve silver without attacking copper. This liquid is simply a mixture of one part of nitric acid with six parts of sulphuric, heated in a water bath to 160 degrees Fahrenheit, at which temperature it operates best. We have the authority of a practical workman of repute for saying that, by means of this liquid, silver and amalgam may be detached from copper plates, without any necessity for wasting acids in dissolving a large amount of useless metal.

Deep Placer Mining in California.

[Continuation.]

PROSPECTS FOR THE FUTURE.

MANY causes have operated to confirm us in the opinion that the future is bright with promise. A more lively interest is felt by capitalists in the examination and development of these dormant resources, and the information disseminated through the medium of the State Geological Survey, and the various reports of the United States Mining Commissioners, have not been without effect in turning the attention of the people to the vast stores of wealth at their very doors. One of the most encouraging features of future progress is the tendency to consolidation and co-operation on the part of owners of mining ground, who are availing themselves of the recent Act of Congress, to acquire a title in fee simple to the land by means of a United States patent.* Should this Act be liberally construed by the various land offices, and no expensive obstacles placed in the way of the miner, seeking to acquire title, (as was the case in the operation of the Act for acquiring title to quartz ledges), much good will result to the State from the passage of this law.

Important improvements have been made in the manner of using water in the hydraulic diggings. Instead of projecting five hundred to one thousand inches of water through two or four pipes, the leading mines now run their water through one pipe by means of the recently invented hydraulic nozzles, and discharge it with immensely increased momentum and effect against the bank they desire to wash down, accomplishing greater results with less labor and expense, and enabling one miner to regulate the discharge of a thousand inches, in streams of six inches in diameter, by means of a lever, moving a nozzle which turns in any direction, with more ease and accuracy than three men could do it by the old process. So powerful is the force exerted by these large streams, under great pressure, that cemented gravel banks which formerly required the use of powder blasts before washing, can now be cut down and removed by the action of water alone.

No less important is the application to mining operations in California of Leschot's Patent Diamond Pointed Steam and Compressed Air Drill, of which Severance & Holt are agents.

Most of the extensive bed rock tunnels in the State were commenced under the old and expensive system of large drills, requiring three men to each drill—two strikers, and one man to turn the drill. Then followed the discovery of Giant Powder, bringing with it the use of the single-handed drill, which reduced the expense of tunneling from twenty-five to thirty-three per cent. The application of Diamond Pointed Borers (as they might more properly be called), promises still further to reduce these expenses to so low a figure as to render these once formidable enterprises practicable in every district.

The expense of running tunnels in California has varied greatly in different districts, according to the character of the bed rock. At Smartsville, Yuba county, where the rock is a hard, flinty trap, the expense was formerly as high as $50 per linear foot. This was reduced to $40 per foot by use of single-handed drills and giant powder, under the contract system. At North San Juan, Nevada county, where the bed rock is a soft granite, the expense per linear foot has not been more than from $35 to $40. Near San Juan, where tunnels have been run, at the junction between the slate and granite, the expense has been reduced to $20 or less per foot. Near You Bet and Little York, where a soft slate occurs, the cost has rarely exceeded $10 per foot; but there are instances where such tunnels are known to have cost $60 per linear foot. These tunnels are generally six or eight feet in height, and four to six feet in width—the one at Smartsville, now being run for the Blue Gravel Company, being still larger.

In another part of this chapter some account will be given of the operations of this invention in California; and it may reasonably be expected that when the compressed air attachment for these machines is completed, they will come into general use, and be instrumental in opening up hundreds of acres of rich ground which would otherwise remain undeveloped. Nearly one hundred of these machines are in successful operation in the Eastern States, being run by steam, which, as a motive power, is not adapted to our small but long tunnels, as the steam pipes render the air hot and close; but this difficulty will be obviated by the use of a compressed air apparatus. The cost of these machines will not exceed (with compressed air power) $10,000, and they will bore inch holes at the rate of from one to two inches per minute in the hardest rock.

As these improvements are adopted the amount and profit of this branch of mining increases, and the steady operation of these causes, including the facilities for the procurement of title to mining ground, has a tendency to materially increase the gold product.

CEMENT MINING BY MILL PROCESS.

The ancient channel claims worked through tunnels and shafts have not, as a general rule, proved remunerative for a few years past, although some mines of this character, of which we may instance those in the vicinity of You Bet, Nevada county, have yielded enormous returns, at irregular intervals. The great obstacle to permanent success seems to be the "spotted" character of the channels, and the difficulty of tracing, underground, the sinuosities of the ancient streams, together with the cost of timbering, draining, hoisting, etc., incident to underground operations. At many places which have not been covered with the lava flow, or where the top dirt is denuded, the owners of this class of claims have suspended milling operations until they can wash off the overlying deposits, (which will pay largely where water is abundant) down to the hard cement. They will then have the advantage of working this bed-rock with some degree of certainty in following the course of the channel, where the richest deposits may be expected, and save the expense of timbering, and much "dead work" in prospecting for the channel. In places, however, where the top dirt has been washed off, and where water power is used for running the mills, this class of mining has been uniformly successful. The expense of mining and milling in claims of this character may vary from 75 cents to $1 per car load of 16 cubic feet (equivalent to one ton) as at French Corral, Nevada county, while in many claims between the North and Middle Forks of the American River, when long tunnels are run under the lava crust, and the mills are worked by steam power, the average cost of milling and mining, per 16 cubic feet, will reach as high as $2 or $2 25. Mines thus situated are rarely remunerative, except in seasons where a "strike" is made. An improvement has been made in this branch of mining by the substitution at several mills of coarse screens, with apertures one-quarter of an inch in diameter, instead of the one-eighth inch screens heretofore in use. The result has been an increase in crushing capacity of twenty-five per cent., without affecting the product of the cement.

EXTENT OF THE DEEP PLACER DEPOSITS.

The Deep Placers, as we have seen, are contained within certain geographical boundaries embracing 4,000 square miles, within which are found six of the prominent mountain rivers of California and their tributaries, to wit: the Feather, the North, Middle, and South Yubas, and the North and South Forks of the American River. The "divides" between these streams all contain enormous extents of detrital deposits, which have been discovered and opened at places where "slides" have occurred. The eastern extremities of these divides are covered with lava or volcanic ashes, and the western are lost in a series of low foot-hills, running into the Sacramento Valley, where the deposits are of slight depth, but, as a compensation, rich veins of quartz are found.

The most extensive deposits occur in the counties of Sierra, Placer and Nevada. In Sierra county two belts are found, running parallel with each other, in a northerly and southerly direction, embracing almost the total area of the county. One of these has the characteristics which have given it the name of the Great Blue Lead, from the colors and character of the cement found on the bed rock. In Nevada county, besides the existence of these belts, an intricate system of ancient channels and basins exists, calculated to confuse and bewilder the observer who is anxious to find evidence for his "old channel theory." Nevertheless, the Blue Lead is here unmistakably defined. In Placer county, between the North and Middle Forks of the American River, an enormous expanse of auriferous ground exists, incompatible with the theory of one or many ancient channels.

The most extravagant statements have been made by enthusiastic persons who have visited the region under consideration, and computed the extent of the gravel deposits and their richness. One estimate has placed the area of detrital deposits between the Middle and South Yuba rivers at 200 square miles. An acquaintance with the ground in question warrants us in the belief that such an estimate is greatly exaggerated.

Up to the present time no surveys having for an object the approximation of the extent of the deep placers have been completed, though such a work is now being carried on in the interest of the State Geological Survey; it will be many years, however, before its results are made public. The only map which pretends to indicate the detrital deposits is a map of the Central Mining Region of California, compiled by A. J. DOOLITTLE, in which he has relied more upon his personal knowledge of the country, in designating the locality of such deposits than upon actual surveys. The map, however, is generally accepted as correct and reliable.

From the light at present thrown on the subject, the writer, if compelled to hazard an estimate of the area of the deep placers, would place it at between 400 and 500 square miles, with an average depth of 120 feet, and would feel confident that he had rather understated than exaggerated the amount. When we compare this vast extent of ground with the limited quantity worked, we feel confident in stating that in comparison to the undeveloped ground the labor of years has resulted only in extensive prospecting.

PROBABLE GOLD PRODUCING CAPACITY OF THE DEEP PLACERS.

In making an estimate of the capacity for production of the deep placers, we meet with still greater obstacles, on account of the difficulty of obtaining accurate statements of the yield of the ground. The entire extent of the auriferous ground between the Middle and South Yubas has been estimated to contain from 30 to 35 cents per cubic yard. This estimate has been based on the returns from ground worked in the vicinity of North San Juan, Nevada county, which, from the great natural facilities of this locality for running off vast quantities of dirt, cannot be taken as a criterion for other districts.

The operations of the American Company, at Sebastopol Hill (near North San Juan), afford the best means of making an approximation of the quantity of gold contained in a cubic yard of the auriferous deposit. The result of sixteen years' work shows that a production of between 25 and 30 cents per cubic yard has been reached. This would give a product, estimating on an average depth of deposit of forty yards, of the enormous sum of between $50,000 and $60,000 per acre.* But this company, on account of its natural advantages of situation (which will be explained hereafter in a description of the ground), saves a greater proportion of its gold than any other hydraulic claim in California, and its ground is undoubtedly richer than the average.

The ground lying between Greenhorn creek and Bear river, Nevada county, though it has yielded enormous returns to its owners, until the partial filling of its outlets by "tailings," has never reached an average of 25 cents per cubic yard; and at Gold Run, Placer county, one of the most productive regions of the State, the success of the miners is to be attributed to the quantity of ground washed, on account of its softness, rather than to its richness. These last named localities possess the advantage of an abundance of water at low rates—prices ranging from 10 to 12½ cents per inch, while at North San Juan 16⅔ cents per inch is paid.

Between the north and middle forks of the American river, in Placer county, the ground has probably yielded a higher average per cubic yard than at any other locality. We are led to this conclusion from the great productiveness of this part of the country in proportion to the amount of water used, which here is very limited.

The cost of hydraulic mining, per cubic yard of dirt washed, will differ in the various localities, according to the price of water and the character of the bed rock. Professor SILLIMAN, in an article on the resources of Nevada county, quoted in Ross BROWN'S report, placed it at 20 cents per cubic yard, but the writer feels confident that the estimate is too high by over fifty per cent., and that hydraulic ground yielding twenty cents per cubic yard will pay largely at any place in California.

W. A. S

*As an instance of the beneficial operation of this law, we may mention the fact that one company, the North Bloomfield Gravel Company, of Nevada county, are now applying for a patent to 1500 acres of mining ground, lying between the Middle and South Yuba Rivers.

*The ground of the American Company has an average depth of fifty-six yards.

The Silver Mines of Robinson District, Nevada.

TO THE EDITOR: SIR—Robinson District is situated forty-five miles due east from Hamilton, in White Pine county, Nevada. The district came into favorable notice about a year and a half ago, and at the present time has acquired considerable importance, as the development of the claims since the first discovery has established their richness. The country rock is limestone and porphyry, and the former is in places uplifted by diorite. In the limestone and porphyry occur mineral deposits, carrying carbonates of lead, galena, and in some instances red oxide of copper. In the diorite occur *veins* carrying galena with fluorspar as predominating gangue. The *Isaac*, mentioned hereafter, is one of these. The pure galena from these veins assays $75 in silver. The ores carry always a very large percentage of quartz, and they require, therefore, very close selection to fit them for smelting.

Most of the mines and mining claims, thirty-six in number, are owned by Chicago capitalists, Messrs. CUMMINGS and WALLER, and I am indebted to Mr. E. G. Moss, the mining engineer of the company, for much of the following information. The principal mines are the FLYING CLOUD, ISAAC, ELIJAH, OLD ENGLAND and GEN'L GREGG, which have been worked by the company during the last year. Several hundred tons of smelting ores have been extracted, and the owners have found sufficient encouragement in the appearance of their mines to erect a large furnace for the reduction of their ores.

This furnace is the largest one in Nevada, except the Pilz furnace in Eureka. The furnace is a blast furnace, with four tuyéres. Its inside horizontal section is 3×4 feet, and the blast is supplied by a No. 8 Sturtevant blower, driven by a twenty horse power engine. The capacity of the furnace is twelve to fourteen tons per day.

By far the largest portion of the ores cannot be smelted at present, as a preparatory dressing is required to fit them for the furnace. The works being located at the head of Murray Creek, water for this purpose is abundant, and the erection of dressing works is contemplated. Meanwhile the ores are picked by hand, and the first campaign lasted a fortnight and produced eighty-one tons of bullion. The bullion assays $410 in silver per ton.

The ores of at least one of the above named mines contain some gold. This is the ELIJAH, but the contents per ton being only from $10 to $12, and the ores being mixed with those from all the other mines, the gold is not at present available. The carbonate ores assay about $110, and the galenas about $90 per ton in silver. This refers of course to the ores picked out for smelting. According to Mr. Moss the mines are amply able to supply the furnace, especially after dressing works have been built. Wood in the neighborhood is comparatively plenty. It is the same as found in other portions of Nevada, pine and mahogany, and does not make very good coal except when carefully burned and handled. The Chicago company employs about seventy-five hands, including furnace men, wood choppers, etc.

About four miles from Mineral City, the town of the district, an important mine, the CARBONATE, is worked by other parties and small smelting works are being erected. The ores from this mine assay, according to Mr. Moss, $53 in silver and about $50 in gold.

Robinson District, like all the mining camps in eastern Nevada, suffers as yet from high labor and transportation. But at least in regard to the former there are good prospects of a speedy change for the better.

E.

Arizona Diamonds.

AT a recent meeting of the California Academy of Sciences, held in San Francisco, Prof. G. Davidson, of the Coast Survey, stated that true diamonds had recently been found in Arizona, the specimens having been brought in by prospecting miners, among a great variety of minerals, including rubies and garnets. It is stated that the miners, not recognizing the rough diamonds, had thrown away some large and valuable specimens. The largest diamond brought to San Francisco will, it is estimated, weigh three carats when cut and polished, and will then be worth $500. The *Alta California* says that diamonds, have been found in fifteen or twenty different localities of California, but all are of small size, the largest not exceeding 7¼ grains, or weighing less than two carats. There are large, so-called "California diamonds" exhibited in the shops of San Francisco, but they are only beautifully clear crystal quartz.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor.

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The New Mining Law.

WE publish this week the text of the new mining law as it passed the Senate the other day, and will probably pass the House before the end of the session. As our readers will see, it differs essentially from the bill introduced a few weeks ago by Senator STEWART, upon which we commented at that time, suggesting several changes in its plan and detail.

We are happy to say that the new bill in its amended form is free from the objections urged against the former bill, and remedies the principal evils of the present statute. It is undoubtedly the wisest and most beneficent measure that has ever been proposed in Congress on this subject; and we expect to see intelligent men in all the mining communities rally in its favor, give it a fair trial, and acknowledge its great value and importance.

With regard to placer mines, the bill does nothing more than facilitate the acquirement of title from the United States, by simplifying the steps prescribed to the applicant for a patent, and by fixing the status of a quartz lode, discovered (as many a quartz lode is discovered) on a placer claim.

With regard to lode mines, three provisions of the greatest importance are established. In the first place, the title of the miner to the surface of his claim is distinctly declared. This, we have often argued, is really involved in the spirit and letter of the present law, which grants the land and fixes its price *by the acre;* but courts and juries have held both ways, and the muddle-headed official recently in charge of the General Land Office at Washington increased the doubt and confusion by patenting the same land over and over again to different parties. The law was not, at best, a perfectly transparent solution; but the law with Mr. WILSON stirred into it was one huge precipitate of amorphous opacity—voluminous instructions, learned contradictions and pompous dogmatisms, bobbing about in boiling confusion, and diluted, but not clarified, with no end of watery matter. Now we shall have, we trust, a clear and explicit law, which the jury-box cannot defy, and the bench and the bureau cannot, by the most ingenious stupidity, manage to misunderstand. At the same time, rights now existing are fully protected. Our friends in the mining districts need not cry out that the proposed law is unjust to miners. It is unjust to no one, since it simply declares that hereafter certain regulations shall be observed, which have heretofore been neglected. For a score of years the United States has permitted the miners on the public lands to prescribe their own rules of title and occupancy; and a pretty mess they have made of it! One after another, the different State and Territorial legislatures have been obliged to step in and overrule the selfish, lawless, short-sighted, absurd and contradictory whims called district mining laws. Sometimes, as in the case of California, true principles have been established and substantial justice secured; sometimes, as in the case of Nevada, the attempt has been a failure. Everywhere the lawyers have thriven, and both miners and capitalists have bitterly suffered from this state of things. At last, and we trust not too late, the matter is taken in hand by supreme power, and will be dealt with in the light of universal experience.

The two other great features of the proposed law are equally concerned in the foregoing remarks. They are, the provision for proper record and definition of claims, and the provision for a certain amount of work annually to maintain the possessory title. It is amazing that this great reform has not been effected before now. The investment of capital in mining, without such security as is afforded by certain title, is a farce to outsiders, but a tragedy to the parties concerned. Particularly disastrous hitherto has been the effect of the reigning confusion and corruption upon mine-owners of moderate means. Rich men who owned rich mines could afford to defend themselves at law, and, in many cases, to fee the jury as well as the counsel; but poor men, willing to put their little money and their great industry and energy into the actual development of mines, were liable to become the victims of blackmailers and pirates.

Many districts are now languishing, with paralysed industry, because all the ground has been covered with wild-cat locations, so that, if any one opens a mine, and by good luck and hard work makes it pay a profit, some claimant is sure to start up, with documents and witnesses, to show that the present "Golconda" is the same as the ancient "Mary Ann," which he located once on a time and then abandoned, or which he bought from the original locator and abandoner, when the latter was "dead broke," and wanted to get to the States. This bill, if it becomes a law, will put an end to such mockery of mining within a year from its passage. We do not, indeed, expect much actual development to be accomplished directly by requiring twenty-five dollars' worth of work every year on a claim; but it will no longer be possible for speculative but impecunious individuals to hold thousands of "feet" of mining property, without doing any work upon them. The door will be opened to honest industry, and slammed in the face of greedy idleness and fraud.

In this way the mining lands will be put, so far as the nature of the case permits, in the same category as the agricultural lands, of the public domain. The Government says to both farmer and miner: Occupy and use, and you may possess. But the miner, in consideration of the peculiar risk and hardship of his undertaking, is the more favored of the two. No limit is set to the amount he may occupy, use, and either hold in perpetual possessory title, or acquired as the privileged purchaser at a fixed, low price. It is only demanded of him that he shall declare his claims distinctly, not take so much in any one place to exclude others entirely, and not defeat the object of all the mining laws by abandoning his work while still claiming the exclusive privileges attendant upon *bona fide* work, and upon nothing else. With the liberal grants made to him, he ought to be satisfied. If he is really a miner, he will be satisfied. If he is merely a broken-down speculator, who calls himself a miner, but whose real business is to locate, or buy, hold, "stock," and sell, paper mines, he will probably grumble, because under this law his profits may be curtailed. The mine-selling business has been "a good thing" to these sharpers. All they had to do was to negotiate; Uncle Samuel generously allowed them to take their stock in trade free. Now he will give them the broom-corn, but he will insist on their making the brooms. A sad change for the chevaliers of industry!

Doubtless some minor points in the new law would be found to require modification to ensure its smooth working. Those may be left to the indications of future experience. In its main features it is an eminently wise and salutary measure. We earnestly call upon the House to pass it without delay; and we thank Senator STEWART for the courage and judgment which he has displayed in giving us this new proof of his intelligent, earnest devotion to the true interests of the mining industry.

Telegraph Cables.

WE published last week a table showing the progress which has been made in laying cables during the past year. Reference to this table will suffice to show the present importance of this branch of industry, which ten years ago was almost undreamed of. We all remember the excitement produced, in New York particularly, when the news of the successful laying of the first Atlantic Cable was reported. The Niagara, the vessel that had been sent out by our Government to lay the American end of the cable, was visited by thousands, and the gigantic nature of the undertaking was the theme of universal comment and surprise. Shortly after the congratulatory messages between the Queen and President had been exchanged, the cable failed entirely to transmit any signal whatever, and then the disappointment was felt with equal severity. In 1865, the second attempt, likewise resulting in failure at first, so dampened the public ardor on the subject that but few believed that a cable would ever be successfully laid. But during the following year the long wished-for success was accomplished. In fact so much knowledge on the subject of ocean telegraphy had in the meantime been acquired, that the attempt to repair the cable of the previous year was also successfully conducted, and for some time we had two cables in good working order. More recently a third cable, the French one, was successfully laid with ease and rapidity, and without any doubt being expressed as to its probable success before the work began; proving both that vast improvements had been made in the machinery for laying, and that the public confidence in the success of such undertakings, which had been considerably shaken by repeated failures, had again been restored by subsequent successes.

The fact of the matter is, that we have actually acquired sufficient knowledge of the proper construction of telegraph cables, of the machinery necessary for paying them out from ships, and sinking them in the sea, that in such weather as is ordinarily prevalent on the Atlantic in the summer months, an undertaking of this nature can be successfully accomplished at least nine times out of ten. This progress in such an important branch of engineering certainly affords just cause for congratulation. During the past year, as shown in the table above alluded to, over fourteen thousand miles of submarine cable were manufactured, and over eleven thousand laid.

But we must remember, that in order to make ocean telegraphy a successful, paying institution, it is not only necessary to lay the cable, but to maintain it in good condition for a considerable period. So far as this latter important subject is concerned, we have much less cause for congratulation. The Atlantic cable of 1866 has twice been broken, and that of 1865 once, and neither of them have yet been repaired. The French cable has been broken, but again repaired, and is now the only one in working order. This side of the subject is certainly less pleasing than the other, and if we are to have continued and cheap telegraphic communication with Europe, a remedy must be found. The companies are not very communicative on the subject of the breaks, but it appears that most of them have occurred in shallow water, and hence the inference has been drawn that these portions should be made heavier. By some it is supposed that off the coast of Newfoundland icebergs cut the cable to pieces as they rub along the rocky bottom. This is, however, an extremely mournful view of the subject with reference to the future of ocean telegraphy. If a cable must be made strong enough to moor icebergs with, we should require an immense capital to construct the cable, and immense ships to transport it. At all events, whether this explanation is correct or not, it is certain that either the shore ends must be made heavier, or some other steps must be taken to secure the future stability of the ocean cables. We have not the slightest doubt that the ability and energy that planned, constructed and laid them, will suggest the remedy required.

New Publications.

DESILVERIZATION OF LEAD BY ZINC. *Translated by* FREDERICK PRIME, JR., Professor of Metallurgy and Mineralogy at Lafayette College, Easton, Pa.

This pamphlet is a translation of the memoir of Messrs. WEDDING and BRUNING, published in the seventeenth volume of the Prussian "*Zeitschrift für Berg-Hütten-und-Salinen-Wesen.*" It contains the latest results of foreign experience in this important field, and will be welcome to American metallurgists. Prof. PRIME has brought to the work of translation not merely a knowledge of the German language, and of technical literature, but a practical acquaintance, from personal observation, with the processes described. A series of journeys during three years of European residence gave him opportunities to study and compare all the methods of zinc desilverization in use. He concludes that the Cordurie process is decidedly the best and most economical; that it has great advantages over that of Pattinson; that it may be economically used wherever the price of zinc is not exorbitant, and that its general adoption is only a question of time. This is the process described in the present memoir. The different steps of desilverizing the lead, refining the desilverized lead, and treating for the extraction of silver the argentiferous zinc scum, are described at length, and illustrated with engravings. We presume the book can be obtained of the publisher, SAMUEL FRENCH, 13 and 15 Park row, or of the author, at Lafayette College.

ANNUAL REPORT OF THE STATE GEOLOGIST FOR THE STATE OF MISSOURI. Prof. ALBERT D. HAGER, recently appointed geologist of Missouri, has rendered a brief preliminary report, which the State has published in a small pamphlet. It is principally occupied with a *resumé* of the work done by the former geologists, and a statement of Prof. HAGER's plans for the future. From the few and incomplete notices of the present mining industry of Missouri, we extract a passage concerning tin, which may interest, though it cannot well enlighten, our readers. The professor says: "It has several times been announced in the newspapers that there were rich tin mines in the State, and recently I hear it is reported that I have made an assay of the ore at the mines, and am fully satisfied that tin exists in great quantity. It seems due to myself, under the circumstances, that an explanation be made. On the 19th of November I visited the so-called tin mines of Madison county, and saw an assay of the ore, and now have a button of tin which came from the bottom of the crucible after the assay was made. I was not able to detect any fraud or trick by which the tin was put into the crucible, still I am not satisfied that there is a trace of tin in any rock found in Madison county.

"If the greenstone which was pulverized and put into the crucible produced the tin which I found there, then the tin mines of Missouri will far excel in value the mines of Cornwall, for the entire base of the mountain is evidently made up of this eruptive rock. And it is abundant elsewhere.

"I entered and examined the four adits, and the material that had been taken from them, but saw no evidence of any vein, nor did I see anything which, to my mind, was tin ore. I took some of the rock from which the piece was broken that was pulverized, and also some of the pulverized ore and fluxes used in the assay at the tin mines, just equal to the amount put into the crucible, brought them away and propose to have them tested in the best possible manner as soon as the work can be properly done. If tin is found I shall be most happy to accept the fact and add it to the large list of valuable minerals already known to exist in the State."

NOTICES OF MINING MACHINERY *and Various Mechanical Appliances in Use, chiefly in the Pacific States and Territories, for Mining, Raising and Working Ores, with Comparative Notices of Foreign Apparatus for Similar Purposes.* By W. P. BLAKE. New Haven: CHARLES C. CHATFIELD & Co., 1871.

These enterprising publishers have issued in a small, neat volume the chapters on the above subject, contributed by Prof. BLAKE to the last report of the U. S. Commissioner of Mining Statistics. The Commissioner says, on this head, in his introductory letter to the Secretary of the Treasury: "The part devoted to mechanical appliances of mining is the work of Prof.

W. P. BLAKE, and I believe it could not have been in better hands. Limited as to time, space and means, Prof. BLAKE has nevertheless succeeded in presenting a general view of the subject intrusted to him, which shows his great familiarity with the whole field, and will be, I trust, very serviceable to the country." After such praise from such a source, it will be evident to those who know us that our opinion of this work must be a highly favorable one. The topics discussed are, breaking down rocks and ores; boring and excavating by machinery; transportation, ventilation, breaking, crushing, grinding, separation, concentration, etc. The book is issued in handsome style, and abundantly illustrated with engravings. The description and illustration of the well-known BLAKE rock-breaker are the best we have ever seen. Prof. BLAKE's relation to the inventor and manufacturer have enabled him to give an admirable exhibit of the construction and applications of this world-celebrated machine. It is now recognized by mill-men that a rock-breaker increases by many per cent. the daily capacity of a stamp-mill; and all information as to the best breaker is just now especially timely.

Railway Practice and Human Life.

TO THE EDITOR: SIR—The recent horrible accident upon the Hudson River Railroad has brought forth, as such events invariably do, a host of newspaper criticisms, suggestions and grave Bunsbyisms. The comments of the laity on such occasions are seldom of much value. They are not founded in such a thorough knowledge, either of the causes of the immediate disaster or of the general conditions of railway practice, as to entitle them to the consideration of experts.

One of the points recently brought up in this manner, is, we think, however, deserving of attention. It is suggested that the tracks of our railways are laid too close together. This being a feature due solely to the desire of saving money in grading the road-way, and one which does not otherwise affect the questions of construction and operation, it may be appreciated by all ordinarily intelligent people.

Scarcely any one can sit with nerves undisturbed, by the window in a fast express train, while another train whizzes by with equal speed in the opposite direction. The moment is one of real, however evanescent terror, and we add, it is one of great, though transitory danger. If the tracks were further apart this danger would be lessened; an easier course would be to prohibit this passage of trains at double speed.

Such precautions might not have prevented the slaughter of last fortnight; but they may prevent some future catastrophe, or rather, some future catastrophe may befall us, to show how it might have been prevented. For we always shut the door through which the horse was stolen, and leave some other door unlocked, through which to lose another steed. A. C.

The Mining Law.

As amended and passed in the Senate of the United States, Feb. 8, 1871.

Be it enacted, etc., That the mineral lands of the public domain, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and occupation, for mining purposes, by all persons, subject to such regulations as may be prescribed by law, and subject also to the local customs or rules of miners in the several mining districts, so far as the same may not be in conflict with the laws of the United States.

SEC. 2. *And be it further enacted*, That the miners of each mining district may determine the length of their mining claims upon veins or lodes of quartz, or other rock in place, bearing gold, silver, cinnabar, lead, tin, or copper, subject to the following limitations: Claims located previous to July twenty-six, eighteen hundred and sixty-six, shall be limited as to extent along the vein or lode by the local laws or customs existing at the date of the location. Single claims located subsequent to July twenty-six, eighteen hundred and sixty-six, shall not exceed two hundred feet in length along the vein or lode, with an additional claim of two hundred feet for discovery to the discoverer of the vein or lode. Several persons may locate in common on a vein or lode, each person taking one claim; but no person, except the discoverer, shall locate more than one claim upon the same vein or lode, and the aggregate amount of a location in common, made subsequent to July twenty-six, eighteen hundred and sixty-six, shall not exceed three thousand feet in length along the vein or lode. No claim shall extend more than three hundred feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing at the passage of this bill shall render such limitation necessary. The end lines of each claim shall be parallel to each other, and at right angles with the general course of the vein.

SEC. 3. *And be it further enacted*, That the locators of all mining locations heretofore made, or which shall hereafter be made, on any mineral vein, lode, or ledge situated on the public domain, their heirs and assigns, where no adverse claim exists at the passage of this act, so long as they comply with the laws of the United States, and with State, territorial and local regulations, not in conflict therewith, governing their possessory title, shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes and ledges throughout their entire depth, the top or apex of which lies inside of such surface lines, extended downward vertically, although such veins, lodes or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side lines of said surface locations: *Provided*, That their right of possession to such outside parts of said veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward as aforesaid, through the end lines of their locations, or locations in common, so continued in their own direction, that such planes will intersect such exterior parts of said veins or ledges: *And provided further*, That nothing in this section shall authorize the locator or possessor of a vein or lode, which extends in its downward course beyond the vertical lines of his claim, to enter upon the surface of a claim owned or possessed by another.

SEC. 4. *And be it further enacted*, That where a tunnel is run for the development of a vein or lode, or for discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes, not previously known to exist, discovered in such tunnel, to the extent of five hundred feet on each side of the same; and locations on the line of such tunnel of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid.

SEC. 5. *And be it further enacted*, That the miners of each mining district may make rules and regulations, not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground, so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims, located by reference to some natural object or permanent monument, as will identify the claim. After the passage of this act, and until a patent shall have been issued, not less than twenty-five dollars' worth of labor shall be expended on improvements made upon each claim of two hundred feet during each year; but claimants in common, as defined in the second section of this act, may cause all the labor to be expended for improvements to be made upon any one claim, provided the aggregate amount equals twenty-five dollars a year to each claim of two hundred feet. And upon a failure to comply with this condition, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: *Provided*, That the original locator has not resumed work upon the claim after such failure and before such location.

SEC. 6. *And be it further enacted*, That a patent shall be obtained in the following manner: any person, association, or corporation in possession of a mining claim or claims in common, who has complied with the mining regulations and the laws of the United States, may file in the local land office an application for a patent showing such compliance, together with a plat of the claim or claims in common; a copy of such plat, together with a notice of intention to apply for a patent, shall also be posted in a conspicuous place on the claim for the period of ninety days. The register of the land office, upon the filing of such application and plat, shall publish a notice, that such application has been made for the period of ninety days, in a newspaper published nearest to said claim, and he shall also post such notice in his office for the same period. The claimant, at the time of filing his application, or at any time thereafter within ninety days of publication, shall file with the register a certificate of the United States surveyor general that one thousand dollars' worth of labor has been expended or improvements made upon the claim, by himself or grantors, that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim and furnish an accurate description, to be incorporated in the patent. At the expiration of the ninety days of publication, the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the clain during said period of publication. If no adverse claim shall have been filed at the expiration of the ninety days of publication, it shall be assumed that the applicant is entitled to a patent, and that no adverse claims exist, and thereafter no objection from third parties to the issuance of a patent shall be heard except it be shown that the applicant has failed to comply with this act.

SEC. 7. *And be it further enacted*, That where an adverse claim shall be filed during the period of publication, all proceedings except the publication of notice and making and filing of the affidavit thereof, shall be stayed, until the controversy shall have been settled or decided by a court of competent jurisdiction, or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment, and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered, the party entitled to the possession of the claim, or any portion thereof, may file a certified copy of the judgment roll with the register of the land office, together with the certificate of the surveyor general that the requisite amount of labor has been expended or improvements made thereon, and the description required in other cases, and shall pay to the receiver five dollars per acre for his claim, together with the proper fees, whereupon the whole proceedings and the judgment roll shall be certifid by the register to the Commissioner of the General Land Office, and a patent shall issue thereon for the claim, or such portion thereof as the applicant shall appear, from the decision of the court, to rightfully possess. If it shall appear from the decision of the court that several parties are entitled to separate and different portions of the claim, each party may pay for his portion of the claim, with the proper fees, and file the certificate and description by the surveyor general, whereupon the register shall certify the proceedings and judgment roll to the Commissioner of the General Land Office as in the preceding case, and patents shall issue to the several parties according to their respective rights.

SEC. 8. *And be it further enacted*, That the description of vein or lode claims upon the surveyed lands shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued for a vein or lode claims upon surveyed lands, the surveyor general in extending the surveys shall adjust the same to the boundaries of such patented claim, according to the plat or description thereof, as in other cases of private claims.

SEC. 9. *And be it further enacted*, That sections one, two, three, four, and six of an Act entitled "an Act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July twenty-six, eighteen hundred and sixty-six, are hereby repealed, but such repeal shall not affect existing rights, or prevent claimants now prosecuting their claims for patents from proceeding under said act: *Provided*, That this Act shall be enforced as to such claims where it is not inconsistent with the Act approved July twenty-six, eighteen hundred and sixty-six, aforesaid.

SEC. 10. *And be it further enacted*, That the "Act to amend an Act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July nine, eighteen hundred and seventy, shall be and remain in full force, except as to the proceedings to obtain a patent, which shall be similar to the proceedings prescribed by sections six and seven of this Act for obtaining patents to vein or lode claims; but where said placer-claims shall be upon surveyed lands, and conform to legal subdivisions, no further survey or plat shall be required, and joint entries shall be allowed for contiguous claims, as provided in said Act: *Provided*, That proceedings now pending may be prosecuted to their final determination under existing laws; but the provisions of this Act, when not in conflict with existing laws, shall apply to such cases.

SEC. 11. *And be it further enacted*, That where the same person, association, or corporation is in possession of a placer-claim and also a vein or lode included within the boundaries thereof, application shall be made for a patent for the placer-claim, with the statement that it includes such vein or lode, and in such case (subject to the provisions of this act and the "Act to amend an act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July 9, eighteen hundred and seventy) a patent shall issue for the placer-claim, including such vein or lode, upon the payment of five dollars per acre for such vein or lode claim, and one hundred feet of surface on each side thereof. The balance of the placer-claim shall be paid for at the rate of two dollars and fifty cents per acre, and where a vein or lode, such as is described in the second section of this act, is known to exist within the boundaries of a placer-claim, an application for a patent for such placer-claim which does not include an application for the vein or lode claim, shall be construed as a conclusive declaration that the claimant of the placer-claim has no right of possession of the vein or lode claim; but where the existence of a vein or lode in a placer-claim is not known, a patent for the placer-claim shall convey all minerals within the boundaries thereof.

SEC. 12. *And be it further enacted*, That the Surveyor General of the United States may appoint in each land district containing mineral lands as many competent surveyors as shall apply for appointment to survey mining claims. The expenses of the survey of vein or lode claims and the subdivision of placer claims into smaller quantities than one hundred and sixty acres, together with the cost of publication of notices, shall be paid by the applicants, and they shall be at liberty to obtain the same at the most reasonable rates, and they shall also be at liberty to employ any United States deputy Surveyor to make the survey. The Commissioner of the General Land Office shall also have power to establish the maximum charges for surveys and publication of notices under this act; and in case of excessive charges for publication, he may designate any newspaper published in a land district where mines are situated for the publication of mining notices in such district, and fix the rates to be charged by such paper; and to the end that the Commissioner may be fully informed on the subject, each applicant shall file with the register a sworn statement of all charges and fees paid by said applicant for publication and surveys, together with all fees and money paid the register and receiver of the land office, which statement shall be transmitted, with the other papers in the case, to the Commissioner of the General Land Office. The fees of the registers and receivers shall be the same as in other cases for similar services. But nothing in this act shall be construed to repeal, impair, or in any way affect the provisions of the "Act granting to A. SUTRO the right of way and other privileges to aid in the construction of a draining and exploring tunnel to the Comstock lode, in the State of Nevada," approved July twenty-five, eighteen hundred and sixty-six. *Provided*, That nothing in this act shall be construed to enlarge or affect the rights of either party in regard to any property in controversy at the time of the passage of the act entitled "An act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July twenty-six, eighteen hundred and sixty-six, nor shall this affect any right acquired under said act.

Eozoon Canadense.

Many eminent geologists, for some years past, have advanced and supported the theory that the Eozoön Canadense was the most ancient of all fossil remains. Specimens of this kind have recently been found in a cutting on the Adirondac and Lake George Railway, in Warren county, in this State, and forwarded to the Geological Cabinet of the General Land Office.

The following able article from the pen of T. MELLARD READE, in a recent number of *Nature*, ought to draw an answer from those who advocate the opposite views.

It is now about five years since a series of communications to the Geological Society of London by LOGAN, DAWSON, CARPENTER and STERRY HUNT, announced the discovery of organic remains in the Laurentian rocks of Canada. They were decidedly interesting, not only as attempting to show that the belts of limestone interpolated in the great beds of Laurentian gneiss were organic in their origin, but also from the *art* which the authors displayed in the mode of placing their views before the public. The realistic manner in which the fossil Eozoön canadense is drawn as it were from the *life*, coupled with the fixed belief in most men's minds that limestone is necessarily organic in its origin, predisposed many to accept the theory without much inquiry. The reputation of Dr. CARPENTER as a physiologist was alone considered sufficient to settle the matter. These views did not, however, long remain unchallenged, for in the following year Professors KING and ROWNEY, in a communication "On the so-called Eozoönal Rock," detailed the elaborate investigations by which they arrived at the conclusion that the presumed fossil was purely a mineral production. The replies that naturally followed were literally little more than reiterations of previous statements, excepting in the important admission from Dr. CARPENTER, that the several features (that is chamber casts, canal system, and proper walls) could be separately paralleled elsewhere. He, however, took his stand upon the combination of the whole found in the Canadian specimens. To the fatal objection that all had been obtained from metamorphosed rocks, Dr. DAWSON replied by producing a specimen from Tudor, Ontario, which Sir W. E. LOGAN goes no further than to declare is from *comparatively* unaltered limestone, but which Dr. DAWSON considers furnishes a conclusive answer to all arguments drawn from metamorphism. Since then I am not aware that any further evidence in favor of the organic hypothesis has been made public. On the other hand, Professors KING and ROWNEY announced in a paper, read before the British Association at the Liverpool meeting, that they had discovered the features of the so-called organism in the Ophite of Strath in the Isle of Skye, an altered sedimentary deposit of the Liassic age, in which evidence of its mineral origin was conclusively proved. Here, at present, the matter rests; but in my opinion ample materials exist for forming a judgment, not by reliance on authority but by independent reasoning. With this object in view, and with your permission, I will proceed to detail a few of the facts of the case. Before doing so I would, however, call attention to the strange absence of any allusion to obvious objections which characterizes the first series of papers, and to the persistent begging of the question involved in constantly speaking of the specimens as undoubted fossils. The adoption of this objectionable practice under authority of such eminent names, is prejudicial to an impartial judgment, as it indirectly influences the mind. I am quite willing to admit that there existed sufficient reasons for suspecting them to be fossils, but I submit that it is not philosophical to state so distinctly before a thorough examination of all the objections. For evidence of this having been done I search these papers in vain. How then can any one, accustomed to scientific methods of investigation, help suspecting that under all this scientific and pictorial use of the imagination there exists or lurks a fallacy?

First, then, the specimen from Tudor has to be disposed of; nor will this be difficult, for it is altogether a lame affair. It is admittedly not from an unaltered rock, so it is difficult to see even how it bears on the question. The distinctive features are also obscure, and the chambers not of the usual form and proportion. To call this Eozoön canadense, and then bring it forward as closing the discussion, is an amusing piece of controversial skill. When it it is more certainly co-ordinated with the specimens, it will be time to discuss it. I simply ask, would it have been pronounced organic had it been the only variety discovered? I think not.

The broad fact then remains unshaken, that in unaltered rocks no Eozoönal structures have yet been discovered. On the other hand, in metamorphosed rocks such structures are abundant, and even Dr. GUMBEL, of the Bavarian Survey, a believer in the Eozoön, has been much mystified by finding its features in impossible places. Not only do we find it in the Laurentians, but in rocks of a much later date, but curiously only in those that have undergone alteration. If it be an organism, then hydrothermal action, it seems, is necessaay to its development, not as one would suspect during life, but ages after its entombment in sedimentary deposits.

The prevailing infilling material of the "chamber casts" representing "the sarcode body of the animal," is also admittedly serpentine, or some analagous mineral—a mineral that forms the basis of no known fossil, consequently we are to assume that at each period of the animal's existence, either the conditions were different to those under which others were fossilized, or that the original infilling has since been replaced by serpentine; and this, be it said, must always have happened in those rocks afterwards selected for metamorphism.

Again, as minerals of this description are never found in unaltered rocks, we must be prepared to believe in the curious coincidence of the same rocks, and only these, having, at periods widely separated in point of time, been selected for the preservation of the organism and the deposit of these minerals. Either we must do this, or be prepared to show that metamorphism must necessarily change the infilling of the "chamber casts" to serpentine. Which supposition is the wildest?

Still further, we must believe that not only has Nature so miraculously preserved her pet animal, but that she has also imitated the fossil organism in the same minerals in an altered rock, in a manner to justify such acute observers as Professors KING and ROWNEY in considering the imitation identical with the thing itself. For in the altered portion of the rock at Strath, before referred to, we have the features of the Eozoön, while the unaltered portion, which it gradually shades off into, teems with characteristic Liassic fossils. Have these fossils been obliterated in the altered portion, or have we the Eozoön again conterminous with the metamorphism?

And, in conclusion, we must further admit that all these conditions have been fulfilled over wide areas and at periods remotely separated with unerring regularity whenever the Eozoön has made its appearance. Is not this an improbability amounting to the impossible? For my part, this negative evidence far outweighs the "determination of its foraminiferal affinities by a point no larger than a pin's head," and I feel assured that whenever impartial geologists take the question up the fossil itself will become extinct.

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111,714.—SEAT FOR VEHICLES.—Daniel R. Allen, Cumberland, Me.

111,715.—COMPASS-JOINT.—Theodore Alteneder, Philadelphia, Pa.

111,716.—LEATHER TO RESEMBLE CLOTH.—Moritz Altmann, Baltimore, Md.

111,717.—RECEPTACLES FOR STATIONARY ARTICLES, &c.—William F. Baade, Buffalo, N. Y.

111,718.—VENTILATOR.—George R. Barker, Philadelphia, Pa.

111,719.—LEATHER-PUNCHING AND FEEDING MACHINE.—William Farry, Carthage, N. Y

111,720, antedated February 2, 1871.—WATER CUT-OFF.—Rufus M. Bixby, Iowa City, Iowa.

111,721.—STEAM RADIATOR.—George W. Blake, NewYork, N. Y.

111,722.—REFRIGERATING OYSTER CAN.—Alfred Booth, Chicago, Ill.

111,723.—CURTAIN FIXTURE.—Charles M. Brown and Cecil L. Gates, Hartford, Conn.

111,724.—COMPOSITION FOR PAVEMENTS.—Closson P. Burgess and James R. Stephenson, Rochester, N. Y.

111,725.—STUMP-EXTRACTOR.—Elisha W. Cady, Tomah, Wis.

111,726.—SEED-SOWER.—George A. Carman, Deer Park, N. Y.

111,727, antedated February 2, 1871.—DRAIN TILE.—Aaron W. Conley, Economy, Ind.

111,728.—SASH BALANCE.—James M. Connel, Newark, Ohio.

111,729.—STATIONARY BELL-HOLDER.—Sylvester Croll, Philadelphia, Pa., assignor to Samuel J. Phillips, same place.

111,730.—APPARATUS FOR LEACHING BARK, &c.—Hilen C. Crowell, Morgan, Ohio.

111,731.—ORNAMENTING MIRRORS.—William M. Davis, Mount Sinai, assignor to himself and S. S. Norton, Brooklyn, N. Y.

111,732, antedated February 4, 1871.—NIGHT LATCH.—Charles C. Dickerman Boston, Mass.

111,733,—WEIGHING SCALES.—Franklin Fairbanks and Harvlin Paddock, St. Johnsbury, Vt.

111,734.—TREATING BLOOD FOR THE MANUFACTURE OF FERTILIZERS.—Levi S. Fales, New York, N. Y., assignor to the American Fertilizing Company, same place.

111,735.—HAY-LOADER.—John E. Fell and John H. Mattocks, Makoqueta, Iowa.

111,736.—DRILL-REST FOR TRENING-LATHES.—Henry H. Folsom, Lowell, Mass., assignor to Charles A. Chase, same place.

111,737.—PURIFIER, CONDENSER, &c., FOR GAS WORKS.—Andrew Fulton, Albany, N. Y.

111,738.—PRUNING-SHEARS.—Erasmus D. Gaines and John A. Mechillen, Chicago, Ill.

111,739, antedated February 2, 1871.—COTTON-PRESS.—John B. Gridley, Lonisville, Ky., assignor of one-third his right to Robert Patterson and Chauncy Rice.

111,740.—INTERFERING-PAD FOR HORSES.—William H. Hall, Boston, assignor to himself and Joseph W. Hall, Charlestown, Mass.

111,741.—ARTIFICIAL LEG.—James Edward Hanger, Staunton, Va.

111,742.—AIR-PUMP.—Charles B. Hardick, Brooklyn, N. Y.

111,743.—EXTRACTING TURPENTINE FROM TREES.—Benjamin I. Hazard, Georgetown, S. C.

111,744.—BARK-MILL.—John Helenbrook, Olean, N. Y.

111,745.—ANIMAL-TRAP.—Asahel A. Hotchkiss, Sharon, Conn.

111,746.—ADJUSTABLE BEVEL.—Leonard D. Howard, St. Johnsbury, Vt.

111,747.—CLOTHES-DRIER.—Leonard D. Howard, St. Johnsbury, Vt.

111,748.—PUMP.—John Humphrey, Keene, N. H., assignor to James Wilson, Bridgeport, Conn.

111,749.—LITHOGRAPHIC PRESS.—Thomas Hunter, Philadelphia, Pa.

111,750.—WASHING-MACHINE.—William G. Jones, Marshall, Texas.

111,751, antedated January 30, 1871.—RUBBER ROLLER FOR PAPER-MACHINES.—Richard A. Kelty, Lambertville, N. J.

111,752.—SEWING-MACHINE.—Eben A. Kimball, Abingdon, Mass.

111,753.—BASE-BURNING FIRE-PLACE HEATER.—Philip Klotz, Baltimore, Md., assignor to Bentley C. Bibb, same place.

111,754.—COMBINATION TOOL.—Josiah B. Lamkin, Champaign, Ill.

111,755.—WAGON-HOUND COUPLING-BOX AND PLATE.—William J. Lewis, Pittsburg, Pa.

111,756.—RUBBER BLOCK HOLDER FOR WAGON BRAKES.—William J. Lewis, Pittsburg, Pa.

111,757.—POST-HOLE DIGGER.—Aaron E. Lindsley, Paw Paw, Mich.

111,758.—BUTTER-TUB, &c.—William Marsh, Waterford, Penn.

111,759.—BAKER'S OVEN.—Alexander Martin, Allegheny, Pa.

111,760.—MILLSTONE-FEEDER AND GRAIN-SCOURER.—Pleasant H. Massey, South Bend, Ind.

111,761.—STEAM LAND-CARRIAGE.—Jerome B. McKinley, Spender County, Ky.

111,762.—COMBINED KEY-RING AND DOOR-FASTENER.—Bryant H. Melendy, Manchester, N. H.

111,763, antedated February 13, 1871.—PUMP-VALVE.—Charles L. Merrill, Watertown, N. Y.

111,764.—PLOW-BEAM.—Samuel Holden Miller, Hamilton, Ill.

111,765.—MACHINE FOR MAKING CANDY.—Thomas Mills and George H. Mills, Philadelphia, Pa.

111,766.—RIDDLE AND THRASHING-MACHINE.—Daniel Murphy, Dubuque, Iowa, assignor to himself and Timothy C. Murphy, same place.

111,767.—CAR COUPLING.—James W. Musser and Ralph Carkhuff, Lewisburg, Pa.

111,768.—STEP AND TRAM-BOX FOR MILL-SPINDLES.—William Giles Morment, Dyersburg, Tenn.

111,769.—HAND-WASHING RUBBER.—Elwood R. Norny, McDonough, Del.

111,770.—BLIND-SLAT REGULATOR.—John T. O'Donoghue and Alexander Leavitt, New York N. Y.

111,771.—ANIMAL-TRAP.—Ebenezer Oliver, New York, N. Y.

111,772.—ROLLED BAR FOR NUT BLANKS.—Henry W. Oliver, Jr., Pittsburg, Pa.

111,773.—STAMP-CANCELER.—Amos D. Owen, Thorntown, Ind.

111,774.—CORN-PLANTER.—John Morse Parsons, Charles City, Iowa.

111,775.—SUPPORTING-CORES.—Enos B. Phillips, Cambridge, Mass.

111,776.—ADJUSTABLE ATTACHMENT OF CAMS FOR FLIERS OF PRINTING-PRESSES.—Charles Potter, Jr., Plainfield, N. J

111,777.—CLOTHES AND HAT-HOOK.—Reuben W. Randall, Biddeford, Me.

111,778.—COFFEE-MILL.—Francois Raymond, Woodhaven, N. Y., assignor to the Lalance and Grosjean Manufacturing Company, of New York City.

111,779.—MACHINE FOR CLEANING AND SCOURING WHEAT.—Ephraim Russell, Minneapolis, Minn.

111,780.—GATE.—Cyrus W. Saladee, St. Catharines, Canada.

111,781.—CULTIVATOR.—Marshall Sattley, Taylorville, Ill.

111,782.—SEWING-MACHINE SEAT.—Sarah A. Sexton, New York, N. Y.

111,783.—WEAVING TUBULAR FABRICS.—Guilford Smith, South Windham, Conn.

111,784.—APPARATUS FOR INSECTING PRESERVATIVE LIQUIDS INTO WOOD.—William H. Smyth, Steubenville, Ohio.

111,785.—BEDSTEAD.—George Snowden, Hudson, N. J.

111,786.—PRAIRIE PLOW JOINTER.—Andrew J. Spicer, Galesburg, Mich.

111,787.—EXCAVATOR.—Thomas Symonds, Portland, Me., assignor to John B. Curtis, same place.

111,788.—MACHINE FOR CUTTING CHEESE, BUTTER, &c.—James H. Thomas, Lynn, Mass.

111,789.—REMOVING SLAG FROM FURNACES.—John Thomas, Hokendanqua, Pa.

111,790, antedated February 11, 1871.—COMBINED FENDER AND GAUGE WHEEL.—Alexander B. Thornton, New Berlin, Ill.

111,791.—APPARATUS FOR THE TREATMENT OF ALCOHOLIC AND OTHER SPIRITS.—Reuben D. Turney, New York, N. Y.

111,792.—METHOD OF ATTACHING HANDLES TO SAWS.—Samuel W. Valentine, Bristol, Conn., assignor to Porter Saw Company, same place.

111,793.—DOUBLE SHOVEL PLOW.—Robert Paten Van Horne, Gratiot, Ohio.

111,794, antedated February 1, 1871.—SMUT AND WHEAT-SEPARATING MACHINE.—William H. Wash, Howardsville, Va.

111,795.—ASH-SIFTER.—William Weaver, Greenwich, N. Y.

111,796.—MACHINE FOR BUNDLING WOOD.—William L. Williams, New York, N. Y.

111,797.—PAPER-TRIMMING MACHINE.—William P. Yeoman, Waukegen, Ill.

111,798.—CHEWING-GUM.—Thomas Adams, Hudson City, N. J., assignor to John D. Adams, same place.

111,799.—SULKY ATTACHMENT FOR BREAKING-PLOWS.—Asa H. Allison, Charlottesville, Ind.

111,800, antedated February 3, 1871.—TOBACCO-PRESS.—Herman H. Alms Kansas City, Mo.

111,801.—TYING BROOMS AND BRUSHES.—James H. Anderson, Terre Haute, Ind., assignor to Thomas Marston, Jr., Walter L. Peck, and Clarence I. Peck, Chicago, Ill.

111,802.—PAPER-BAG MACHINE.—Charles F. Annan, Boston, assignor to himself and Herbert S. Merrill, Cambridge, Mass.

111,803.—PAPER-BAG MACHINE.—Charles F. Annan, Boston, assignor to himself and Herbert S. Merrill, Cambridge, Mass.

111,804.—DEVICE FOR LABELING CIGARS.—Reuben H. Andrews, Washington, D. C.

111,805.—PRINTING-PRESS.—Amos H. Bangle, Brooklyn, Cal.

111,806.—CONCRETE FOR PIPES, BRICKS, &c.—Thomas J. Barron, Brooklyn, E. D., N. Y.

111,807.—BED-BOTTOM.—Van Bell, Seville, Ohio.

111,808.—CORN-PLANTER.—Cyrus F. Bilhimer, Irwin's Station, Pa.

111,809.—SPRING-SUPPORTER FOR CARRIAGES.—Daniel H. Brown, Utica, Mo.

111,810.—MILLSTONE-PICK.—Henry J. Brunner, Nazareth, Pa.

111,811.—COOKING-STONE.—Esek Bussey, Troy, N. Y.

111,812.—COOKING-STOVE.—Esek Bussey, Troy, N. Y.

111,813.—LAMP BRACKET FOR SEWING-MACHINES.—Henry Campbell, San Francisco, Cal.

111,814.—BREECH-LOADING FIRE-ARM.—Martin J. Chamberlain, Springfield, Mass.

111,815.—APPARATUS FOR THE MANUFACTURE OF BESSEMER STEEL.—Henry Chisholm, Cleveland, Ohio.

111,816.—LET-OFF MECHANISM FOR LOOMS.—John Clegg, Warwick, R. I.

111,817.—MACHINE FOR THE MAFUACTURE OF MOLDINGS.—Joseph C. Cooke and Henry A. Whiteley, Preston, Conn.

111,818.—ROTARY STEAM ENGINE.—Philip Cramer, Providence, R. I.

111,819.—FEED-CUTTER.—John Criley, Shiloh Hill, and Whitney Gilbreth, Rockwood, Ill.

111,820.—APPARATUS FOR SMOOTHING AND PRESSING PAPER DURING THE MANUFACTURE.—Daniel Crosby, Hampden, Me.

111,821.—DENTRIFICE.—Oliver Danford, Bibb County, Ga.

111,822.—HUB AND AXLE.—Carlos R. Donner, Sonora, Cal.

111,823.—SHELL FUSE.—Ellis Drake, Stoughton, assignor to himself and John S Smith, Leicester Mass.

111,824.—RAILWAY ALARM.—George Draper, Hopedale, Mass.

111,825.—GAS-BURNER.—Antoine Ernest Dupas, New Orleans, La.

111,826.—CORN-PLANTER.—Arthur Edwards, Cuba, Miss.

111,827.—MAGAZINE FOR BREECH-LOADING FIRE-ARMS.—William H. Elliott, New York, N. Y.

111,828.—SPOOL-SILK CASE.—Samuel Elmer, Ashtabula, Ohio.

111,829.—GAUGE FOR SAW-FILER.—James E. Emerson, Trenton, N. J.

111,830, antedated February 4, 1871.—TRAVELING-TRUNK.—Henry Hubbard Evarts, Chicago, Ill.

111,831.—FENCE.—Osker F. A. Faulkner, Mount Pleasant, Iowa.

111,832, antedated February 10, 1875.—BEDSTEAD AND BED.—BOTTOM.—Frederic G. Ford, Baltimore, Md.

111,833.—TACKLE FOR HOISTING SAILS.—George A. Ford, Oswego, N. Y.

111,834.—MORTISING-MACHINE.—Joseph W. Fowle, Boston, Mass.

111,835.—GRIDDLE.—Titus D. Gale, Waukegan, Ill.

111,836.—FIRE-EXTENGUISHER.—Joseph Gardner, Bedford, Ind.

111,837.—MACHINE FOR NAILING SHOE SOLES WITH WIRE.—Louis Goddu, Boston, Mass., assignor to Elmer Townsend, same place.

111,838.—WATER-METER.—Robert C. Gray and William B. Brittingham, La Fayette, Ind.

111,839.—CHIMNEY-TOP.—Richard W. Griffith, Georgetown, D. C.

111,840.—COTTON-PRESS.—Robert J. Harrison, Raleigh, N. C.

111,841.—ANIMAL-TRAP.—Sanford H. Hart and Hubert C. Hart, Unionville, Conn.

111,842.—EARTH-CLOSET.—Duncan C. Hartman, Baltimore, Md.

111,843.—CLOTHES-LINE FASTENER.—Henry J. Hendey, Wolcottville Conn.
111,844.—HAND-STAMP.—Horace Holt and William W. Secombe, New York, N. Y., assignors to "Secombe Manufacturing Company," same place.
111,845.—SPIKE-EXTRACTOR.—William S. Hough, Johnstown, Pa.
111,846.—PEN-HOLDER.—Isaac Jacobs, New York, N. Y.
111,847.—SASH-CORD FASTENER.—William N. Jackson, Muncie, Ind.
111,848.—THRASHING-MACHINE.—William N. Jackson, Muncie, assignor to himself and Benjamin F. Jackson, Anderson, Ind.
111,849.—MACHINE FOR LINING PASTEBOARDS.—Gustav L. Jaeger, New York, N. Y.
111,850.—STOVE OVEN GRATE.—W. G. James, Richland Centre, Wis.
111,851.—TREATING BONES, HORNS, HOOFS, &c., FOR MANUFACTURE OF FERTILIZERS.—William Burt Johns, Philadelphia, Pa.
111,852.—ATTACHMENT TO PLOWS FOR SUBSOILING.—Ross Johnson, Lawrence, Kansas.
111,853.—GRAIN-DRILL.—Benjamin Kuhns, Dayton, Ohio.
111,854.—PLOW.—John Lane, Chicago, Ill., assignor to Hapgood & Co., same place.
111,855.—MACHINE FOR BENDING WOOD.—Obadiah Marland, Boston, Mass.
111,856.—METALLIC CARTRIDGE.—Edwin Martin, Springfield, Mass., assignor to himself, Samuel W. Porter, and James F. Canston, same place.
111,857.—COMBINED CULTIVATOR AND HARROW.—John Maxton, Sebrook Ill.
111,858.—BOOK-SUPPORT.—John McCausland, Alexander McCausland, and William J. A. McCausland, Providence, R. I.
111,859.—TURNING-LATHE.—Frederick B. Miles, Philadelphia, Pa., assignor to Ferris & Miles, same place.
111,860.—WASH-BOILER.—Stephen S. Miles, Delta, N. Y.
111,861.—COFFEE-POT.—Watson J. Miller, Middletown, Conn., assignor to Simmons & Miller, same place.
111,862.—CONSTRUCTION OF CAR AXLES AND SHAFTS.—James Montgomery, Croton Landing, N. Y.
111,863.—MANUFACTURE OF SHOE SHANKS.—Stephen Moore, Sudbury, Mass., assignor to himself and Homer Rogers, same place.
111,864.—PORTABLE LAUNDRY.—Jacob Morrison, Indianapolis, assignor to Matilda D. Morrison, same place.
111,865.—MECHANISM FOR OPERATING PUNCHING AND EYELETTING MACHINES.—Charles H. Morse, Boston, assignor to himself and William A. Brown Lynn, Mass.
111,866.—WHIFFLETREE PLATES.—Francis B. Morse, Plantsville, Conn., assignor to H. D. Smith & Co., same place.
111,867.—ATTACHMENT FOR SEWING-MACHINES.—Schamu Moritz Moschowitz, New York, N. Y.
111,868.—BARREL.—Henry G. Porter, Grand Rapids, Mich.
111,869.—ELEVATOR AND CONVEYER.—Thomas J. Powell, Naples, N. Y.
111,870.—COOKING-RANGE.—John A. Price, Scranton, Pa.
111,871.—COMBINED AGRICULTURAL IMPLEMENT.—Charles R. Rand, Dubuque, Iowa.
111,872.—STOCK CAR.—Amos Rank, Salem, Ohio.
111,873.—RAILWAY STOCK CAR.—Amos Rank, Henry King, and Joel Sharp, Salem, Ohio.
111,874.—CHIMNEY FOR LIME KILNS.—William Rennyson, Norristown, Pa.
111,875.—DEVICE FOR OBSTRUCTING ANTS.—Emery Rooks, Trenton, Tenn
111,876.—HORSE AND CATTLE POWDER.—Abraham Rudisill and Manrow Sell, Sell Station, Pa.
111,877.—FIRE-EXTINGUISHER.—Enno Saunder, St. Louis, Mo.
111,878.—BEDSTEAD-FASTENING.—John Schepler, Lambertville, N. J., assignor to himself and Shickle, Harrison & Co., same place.
111,879.—CONCRETE PAVEMENT.—John J. Schillinger, New York, N. Y.
111,880.—SPUR-ATTACHMENT TO OVER-SHOES.—Henry Schwandt, New Orleans, La.
111,881.—LUBRICATOR.—Nicholas Seibert, San Francisco, Cal.
111,882.—JAPANNING EYLETS, BUTTONS, &c.—Stephen N. Smith, Providence, R. I.
111,883.—CORN-DROPPING ATTACHMENT FOR HOES.—Edmund L. Staples, Chillicothe, Ohio.
111,884.—LOCOMOTIVE BOILER FURNACES.—Andrew Jackson Stevens, San Francisco, Cal.
111,885.—APPARATUS FOR ASCERTAINING THE PROOF SPIRITS IN FERMENTED MASH.—Giuseppe Taglisbue. New York, N. Y.
111,886.—PAPER FILE.—Jesse F. Tapley, Springfield, Mass.
111,887.—COOKING STOVE.—Nicholas S. Vedder, Troy, N. Y.
111,888, antedated February 3, 1871.—CLOTHES-DRIER.—James K. Wagner, Potsdam, N. Y.
111,889, antedated February 4, 1871.—PINCERS FOR SHOEMAKERS.—Michael Walpole, Milford, Mass,
111,890.—JOINERS' PLANE.—George Allen Warren, North Bridgewater, Mass.
111,891.—TIP FOR WOODEN SHOVELS.—William P. Wentworth, Seneca Falls, N. Y.
114,892.—GAUGE FOR THE CONSTRUCTION OF SEAT CUSHIONS.—John B. Williams, Pleasant Hill, Ohio.
111,893.—VAPOR-BURNER.—Joseph S. Wood, Philadelphia, Pa.
111,894.—PLANING-MACHINE.—Solomon A. Woods, Boston, Mass.
111,895, antedated Febrnary 2, 1871.—SCROLL-SAWING MACHINE.—Samuel Mansker Young, Jacksonville, Ill.

REISSUES.

4,258.—MACHINE FOR SCRAPING LEATHER.—James T. Barnstead, Peabody, assignor, by mesne assignments, to George L. Newcomb, Salem, and James Perkins, Peabody, Mass.—Patent No. 101,081, dated March 22, 1870.
4,259.—PERFORATED SHEET RUBBER.—John Haskins, Boston, Mass.—Patent No. 67,298, dated July 30, 1867; reissue No. 3,100, dated August 25, 1868
4,260.—BURNING-KILN.—Althasar Kreischer, New York, N.Y.—Patent No. 81,793, dated September 1, 1868.
4,261.—FOLDING LOUNGE.—James W. McDonough, Chicago, Patent No. 60,400, dated December 11, 1866.
4,262.—MACHINE FOR FIGURING CARPENTERS' SQUARES.—Norman Millington, Shaftsbury, Vt., assignor, by mesne assignments, to The Eagle Square Company.—Patent No. 10,136, dated October 18, 1853, extended seven years.
4,263.—MACHINE FOR CUTTING STONE.—George Morgan, Brooklyn, N. Y.—Patent No. 22,569, dated January 11, 1859.
4,261.—MACHINE FOR CHANNELING STONE.—Thomas Ross and Rockwood Barrett, Rutland County, Vt., assignees, by mesne assignments, of Andrews T. Merriman and Thomas Ross.—Patent No. 59,856, dated November 20, 1866.
4,265.—MACHINE FOR REDUCING CRACKLINGS, &c., FOR FERTILIZERS.—Armor Smith, Cincinnati, Ohio.—Patent No. 71,545, dated November 26, 1867.

DESIGNS.

4,646.—INFANT'S SHOE.—Willard M. Carpenter, Rowley, Mass.
4,647.—STOCKING FABRIC.—Thomas Dolan, Philadelphia, Pa.
4,648.—STOCKING FABRIC.—Thomas Dolan, Philadelphia, Pa.
4,649.—CALENDAR CLOCK DIAL.—Daniel J. Gale, Sheboygan Falls, Wis., assignor of one-half his right to Aaron Huyck, same place.
4,650.—FLOWER-STAND.—Hiland H. Kendric, Fulton, N. Y.
4,651.—CARPET PATTERN.—Hugh S. Kerr, Philadelphia, Pa., assignor to Israel Foster, same place.
4,652.—CARPET PATTERN.—Hugh S. Kerr, Philadelphia, Pa., assignor to Israel Foster, same place.
4,653.—ENGINE-GOVERNOR CASE.—John Augustus Lynch, Boston, Mass.
4,654.—FLOOR CLOTH PATTERN.—Charles T. Meyer, Newark, N. J., assignor to Edward C. Sampson, New York City.
4,655.—FLOOR OIL CLOTH PATTERN.—Charles T. Meyer, Newark, N. J., assignor to Edward C. Sampson, New York City.
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4,661.—FLOOR OIL CLOTH PATTERN.—Charles T. Meyer, Newark, N. J., assignor to Edward C. Sampson, New York City.
4,662.—FRINGE.—Henry Asbury Truitt, Philadelphia, Pa., assignor to Thomas Dolan, same place.
4,663.—TASSELED FRINGE.—Henry Asbury Truitt, Philadelphia, Pa., assignor to Thomas Dolan, same place.

TRADE-MARKS.

155.—PLOW AND OTHER AGRICULTURAL IMPLEMENTS.—John C. Bidwell, Pittsburg, Pa.
156.—SMOKING TOBACCO.—John W. Carroll, Lynchburg, Va.
157.—SMOKING TOBACCO.—John W. Carroll, Lynchburg, Va.
158.—SMOKING TOBACCO.—John W. Carroll, Lynchburg, Va.
159.—GINGER ALE AND WINTER BEVERAGE.—Anderson Carson William Lemon, Hartford, Conn.
160.—COMPOSITION COATING.—David B. Crockett, New Haven, Conn.
161.—STOVE.—Ignatius Droege & Co., Covington, Ky.
162.—PREPARATION FOR THE HAIR.—Charles E. Georger, New York, N. Y.
163.—LACE GOODS.—Abraham G. Jennings, New York, N. Y.
164.—ILLUMINATING OILS OR BURNING FLUIDS.—William E. Jervey, New Orleans, La.
165.—MEDFORD RUM.—Daniel Lawrence & Sons, Boston, Mass.
166.—MEDICAL COMPOUND.—Pemberton Taylor & Co., Atlanta, Ga.
167.—MEDICINAL PREPARATION.—Walter S. Wells and John J. Stell, New York, N. Y.
168.—MEDICINAL PREPARATION.—Walter S. Wells and John J. Stell, New York, N. Y.

EXTENSIONS.

SAMUEL R. SMITH, of Cincinnati, Ohio.—Letters Patent No. 16,454, dated January 20, 1857.
DANIEL W. SHARES, of Hamden, Conn.—Letters Patent No. 16,498, dated January 27, 1857; reissue No. 45, dated March 12, 1661.
PETER COOK, of Tonawanda, N. Y.—Letters Patent No. 16,529, dated February 3, 1857.

DISCLAIMERS.

SAMUEL R. SMITH, of Cincinnati, Ohio.—Letters Patent No. 16,454, dated January 20, 1857.—Filed January 28, 1871.
FRANCIS M. STRONG and THOMAS ROSS, of Vergennes, Vt.—Letters Patent No. 14,119, dated January 15, 1856,—Filed January 10, 1871.

Notes on Assaying.

By B. N. LILIENTHAL, M. E., Stanford Mill, Eberhardt City, Nevada.

THE majority of assayers on this coast use the crucible method in assaying silver ores, charging half ounces of the ore with 1½ ounces of flux, borax or glass, q. s., to form a good slag.

This flux consists of two parts by weight of litharge, one part carbonate of soda (made from the commercial bi-carbonate by driving off one equivalent of carbonic acid), and a reducing agent (charcoal, flour, rosin, etc.), so as to obtain a lead button weighing ½ ounce from 1½ ounces of flux.

When the silver ore contains sulphurets iron is added in the form of a nail to combine with the sulphur, so as to give a lead button which will not spit during cupellation.

But the matte thus formed is always argentiferous, therefore this method is incorrect.

Wishing to satisfy myself with regard to the various methods employed in assaying sulphuretted silver ore, I made a few experiments, the results of which you will find below.

The methods are:—

Ist. Scorification.
IId. The above-mentioned flux, with
a. Saltpetre and a reducing agent.
b. Nothing.
c. Iron.
d. A preparatory roasting of the ore.

VALUE IN SILVER. DOLLARS PER TON.

No.	I. Scorification Method.	II. Crucible Methods. Flux=2 PbO+1 $NaOCO_2$+1-20 Rosin. *a* Saltpetre and Charcoal.	*b.* Alone.	*c.* Iron.	*d.* Preparatory Roasting of the Ore.	Description of the Ore.
1	204.91	197.91	198.50	174 35		Galena, with a very small percentage of quartz.
2	136.63	133.49	133.49	130.35		Galena, with a very large percentage of quartz.
3	232.48	223.06		201.06	220.91	Containing sulphurets of copper, iron and zinc, with quartz.
4	153.91	147.63		141.35	146.05	Containing ditto, but the quartz in excess.

Or reducing these values to percentages, taking the amount of silver obtained by the scorification method as 100, we have:—

No.	I.	II. *a.*	*b.*	*c.*	*d.*
1	100	96.6	96.8	85.9	
2	100	97.7	97.7	95.4	
3	100	96.		86.5	95.
4	100	96.		91.2	95.

It would have been useless to roast the galena ores. In attempting to make II *b* with the last two samples I obtained buttons which spat in cupellation.

From these results I conclude that, in assaying sulphuretted silver ores, the scorification method is the only accurate one.

The method with saltpetre and charcoal gives inaccurate results, and, in addition, requires a preliminary assay to determine the proportion of these reagents, so as to give a lead button of convenient size.

The method with the use of iron is grossly inaccurate, and should be abandoned. With regard to the method II *d*, the loss in silver is in the roasting, which loss is directly in proportion to the arsenic, antimony and zinc contained in the ore (See PLATTNER'S Roestprocesse), and, in addition, we have the losses of manipulation.

With our Treasure Hill chlorides the crucible gives equally good results as the scorification method.

Here in the sage brush, where reagents are so expensive, it behooves us as assayers to be as economical as possible. I have found that sieved wood-ashes answer the same purpose as carbonate of soda for fluxes.

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf

IMPORTANT TO INVENTORS.

WESTERN AND CO.'S PATENT AGENCY.

CHARLES R. ROGERS, Solicitor and Manager.

In connection with the publication of the ENGINEERING and MINING JOURNAL and the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

Being possessed of superior facilities, in connection with our associate attorneys in Washington and foreign countries, for the successful prosecution of this business, we do not hesitate to guarantee satisfaction to all who may entrust their business to our care.

We have engaged as solicitor and manager Mr. CHARLES ROGERS, a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

The specifications, drawings, etc., prepared in our office, will be found to compare favorably with those prepared by any other establishment, while the intimate acquaintance of our manager with the routine of business in the Patent Office, gives us a decided advantage in managing difficult cases.

We are fully prepared to prosecute Rejected Cases and Cases in Interference and Infringements, and also to procure Reissues and Extensions of Patents.

We can also furnish Models for use in the Patent Office, to parties who may desire it, as we have made arrangements for this purpose with one of the most skilful machinists in this country, who possesses every facility for getting up models in the most perfect manner, at short notice, and on reasonable terms.

We shall give special attention to the prosecution of Rejected Applications, which have been improperly prepared by the inventor or incompetent attorneys.

We shall be ready at all times to furnish all necessary information and advice to intending applicants, and give our opinion as to the patentability of their inventions, free of charge; and we make it a rule never to take charge of a case unless we see a reasonable probability of obtaining a patent without first giving the inventor our candid opinion as to the probable result of the application.

OUR CHARGES.

Our charges are as moderate as those of any other responsible patent attorneys, as will be seen from the following figures: For preparing a case (whether simple or complicated) and attending to its passage through the Patent Office, our fee is from $30 to $40, which includes all the necessary papers and drawings. If the application is rejected we make no further charge, but prepare all necessary amendments, and, if requisite, appeal to the Board of Examiners-in-Chief. Most Patent Attorneys make an additional charge on each adverse action of the Patent Office, but we have found it more satisfactory to all parties interested to make our full charge at first; and as we expect no contingent fees, it is to our interest to prepare our cases properly at the commencement, thus avoiding annoyance to ourselves and delay in getting out the patent.

The cost of getting out a patent through our agency is—

For first Government fee, stamp, etc	$16
" our fee	$30 to 40
" final Government fee	20
Total	$66 to $76

If the case has to be appealed, the applicant pays the Government fee on appeal, $10; but we shall ordinarily make no additional charge for our services. The first two items are payable when the application is sent in, and the second Government fee when a patent has been allowed. Before an appeal is taken, in any case, the applicant will be fully advised of all facts and charges, and no proceedings had without his sanction; so that all inventors who employ our agency will know in advance what their applications and patents are to cost.

For Rejected Applications prepared by others, our charges vary somewhat according to the nature of the case, but are generally as follows:

In advance, on receiving the case	$10
When the patent is allowed	$20 to 30
Total	$30 to $40

the applicant paying such Government fees as may be required.

For preparing and filling a Caveat,

Our fee is	$15
Government fee	10
Total	$25

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OFFICE:
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NEW YORK. Jan:1y

WILLIAM F. McNAMARA,
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AND COUNSELLOR-AT-LAW.
No. 37 PARK ROW, NEW YORK, ROOM 22.
Advice in Patent Law given free. mar 8:tf

J. THOULET & C. RASCHER, MINING AND CIVIL Engineers, Maps, Topographical and Mining Surveys, Superintendence of Mines, Metallurgical and Chemical Works, Examinations and Reports on Coal and Metallic Mines, Assays, etc., Oriental building, 122 La Salle street.

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MISCELLANEOUS.

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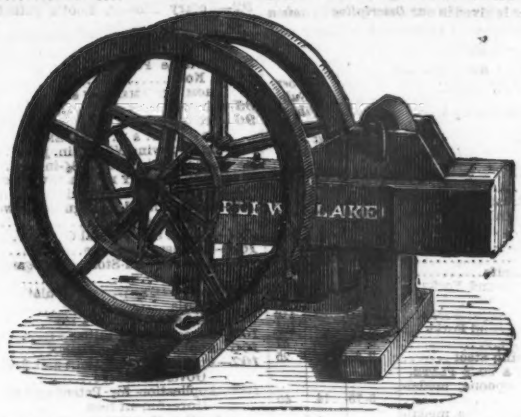

The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

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Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

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Bessemer Steel Rails, Axles, Tyres, Shafting Plates and Steel Forgings,
OF ALL DESCRIPTIONS.
Office in New York, No. 56 Broadway.
May 17:1y

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WORKS NEWARK, N. J., OFFICE No. 61 MAIDEN LANE NEW YORK.
Franklinite Pig Iron (Spiegeleisen), Spelter, Oxide of Zinc,
Spiegeleisen Cinder for Blast Furnaces.
May 24:1y

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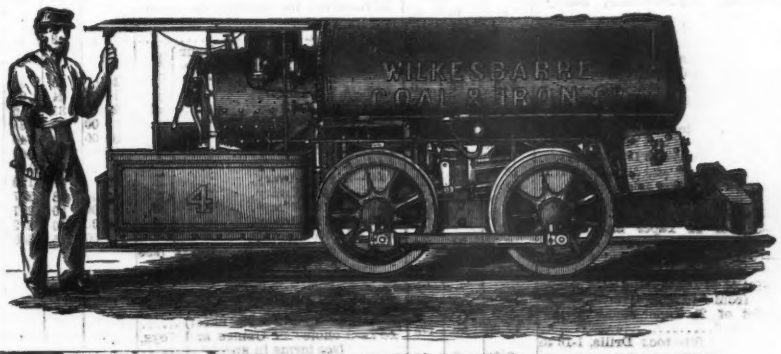
JOHN JEWETT & SONS, AGENTS, 182 FRONT STREET, NEW YORK.
OXIDE OF ZINC, SPELTER, SHEET ZINC.
Jun 28:1y



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Materials and Workmanship Equal to those in Full Gauge Railroad Locomotives.

Guaranteed to pass curves of twenty-five feet radius and haul on a level track in good condition
Three Hundred and Forty Gross Tons of Cars and Load.
For Photograph and full particulars, address **M. BAIRD & CO.,**
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They are made from 4½ to 8½ tons in weight and will haul as great a load *with the same weight of Engine* on any roadway as Traction Engine fitted with Rubber Tyers. Their cost for wear and tear *is less* their first cost is *thirty per cent less*, and their daily working expenses are *not so great by one third*. Fixed and movable machinery can be driven by these Engines without extra cost for fitting them.

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They Sound an Alarm when the limit of pressure is reached, and are adapted for Locomotives, Marine and Stationary Boilers.
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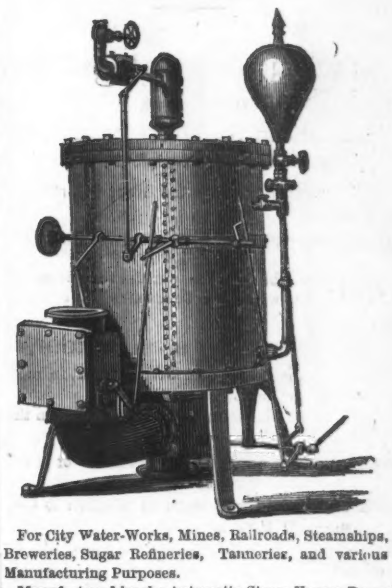

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SIMEON N. DRAKE, Pres. MARTIN KLENEN,
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THE GREAT CHANGES WE HAVE recently made in the construction of our TIN-LINED LEAD PIPE has so added to its strength and durability as fully to entitle it to be termed IMPROVED. The lead coating has been increased, so that all sizes of our TIN-LINED LEAD PIPE are now the same thickness and weight of ordinary lead pipe. The increased thickness of the pipe allows the joints to be made with ordinary Plumbers' solder, and the Pipe to be worked in the same manner as Lead Pipe. The cost of the pipe has been reduced to the low price of fifteen cents per pound, with a discount to the trade.

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These improvements in our TIN-LINED LEAD PIPE have the hearty approval of ARCHITECTS and PLUMBERS wherever they are known.

Warranted to be stronger and more durable than Lead Pipe of corresponding sizes and letters

In ordering or making inquiries for price, send bore of pipe required and head or pressure of water. Circulars and sample of pipe sent by mail free. Address,
THE COLWELLS, SHAW & WILLARD MF'G CO.,
213 Centre street (between Canal and Grand streets), New York.

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"I am of the opinion that your Tin-Lined Lead Pipe will, in a sanitary point of view, be of infinite good to our citizens."—WILLARD PARKER, M. D., New York.

From the American Agriculturist.

NEW YORK, November, 1867.

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NATIONAL PARK BANK,
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DEAR SIRS: Our bank building having been plumbed throughout with your TIN-LINED LEAD PIPE, we take pleasure in stating that it has worked to our entire satisfaction. No repairs have been made up to the present time. Yours respectfully,
J. L. WORTH, Cashier.

THE COLWELLS, SHAW & WILLARD MF'G CO.,
213 Centre street (between Canal and Grand streets), New York, manufacturers of TIN-LINED LEAD PIPE, BLOCK TIN PIPE, LEAD PIPE, SHEET LEAD, SOLDER, &c. Also, the Plumbers' TUBULAR SAFETY JOINT, particularly adapted to LEAD, BLOCK TIN and TIN-LINED LEAD PIPE. Orders solicited.

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25	—Child's Cup, No. 041	2 75	6	25
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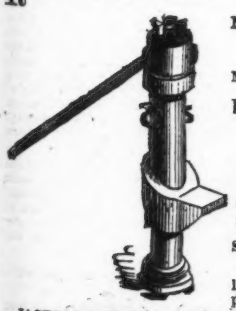

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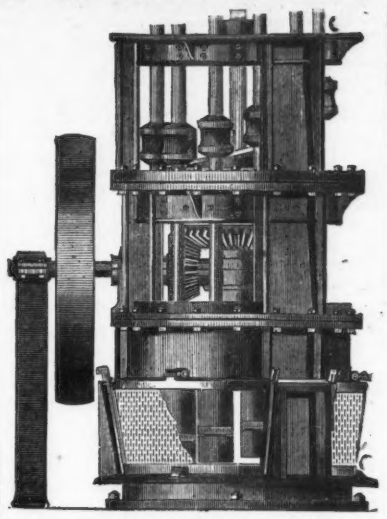

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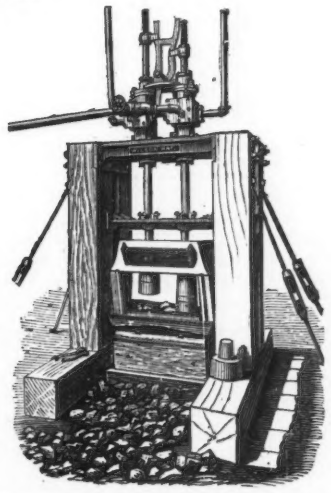

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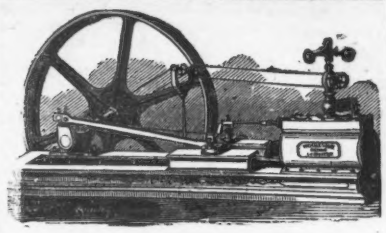

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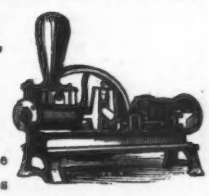

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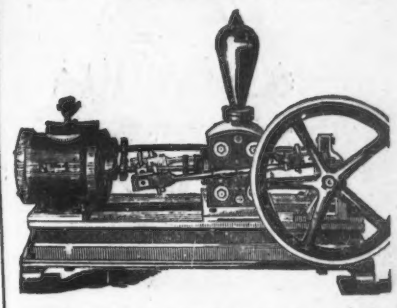

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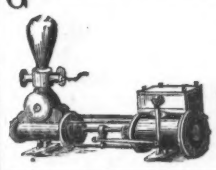

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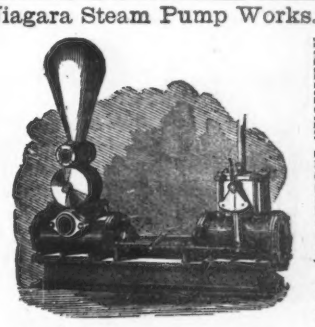

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FOR CUPOLA FURNACES AND FORGES.

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MANUFACTURER OF
Patent Portable Hydraulic Jacks and Punches.
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For Punching Iron, Die-Sinking, etc. Ap 12;1y

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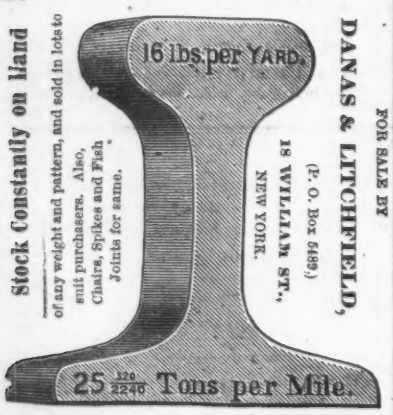

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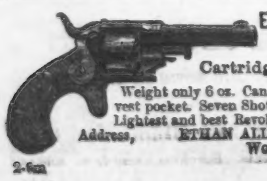

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Nitro-Glycerine, Electric Fuse Exploders, Pure Gutta Percha Insulated Wire.

The Tri-Nitro-Glycerine manufactured under the Mowbray Patents is safer to handle, has 30 per cent. more explosive force, and is a more stable compound, than can be made by the Nobel Process. Our fuses are safe to handle and are sure fire. We purify our own Gum Gutta Percha, and insulate copper wire with machinery (the result of many years' investigation), with the sole view to render blasting with Nitro-Glycerine perfectly safe and 50 per cent. cheaper than with powder. Proved to have double the force in blasting over Dualin, Dynamite, and other adulterations of inferior Nitro-Glycerine with inert matter.

PATENTS—No. 76,499, April 7, 1868.
No. 93,113, July 20, 1869.
No. 94,969, Sept. 21, 1869.
No. 96,465, Nov. 2, 1869.
No. 106,606, Aug. 23, 1870.
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FROM 4 TO 500 HORSE-POWER,
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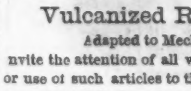

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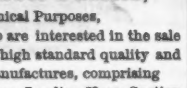

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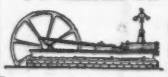

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Mines at Newburgh, Preston Co., W. Va.
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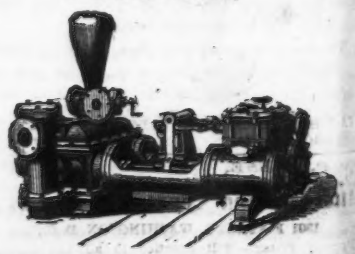

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